

# *CalPHIN*

People • Process • Technology



## California Public Health Information Network Volume I Current Environment



June  
2003

## Preface

---

The Department of Health Services, Division of Communicable Disease Control (DCDC) contracted with Synergy Consulting, Inc. to facilitate development of a Strategic Plan to incorporate the Centers for Disease Control and Prevention's (CDC) National Electronic Disease Surveillance System (NEDSS) standards into the State's public health systems. The DCDC, disease surveillance programs, local health departments, and other public health stakeholders collaborated to develop the strategic plan.



During development of this Plan, the CDC expanded the scope of its NEDSS effort to define a "network" of activities that supports public health surveillance. This expanded initiative is currently known as the Public Health Information Network (PHIN). California's initiative is referred to as the California Public Health Information Network (CalPHIN) Strategic Plan. This gives California a "name brand" that aligns with CDC efforts, incorporates the technical advantages of NEDSS, and includes the expanded value of a common business perspective for disease surveillance.

The CalPHIN Strategic Plan focuses on the people involved in collecting and using the relevant public health information, the business processes that support disease surveillance in the State, and the technology to enable efficient collection and processing of information. The result of the planning effort is presented in four documents.

**Executive Summary:** Summarizes the information contained in the three detailed volumes of the Plan.

**Volume I Current Environment:** Provides an overview of the current technical information systems that support disease surveillance throughout the State. Volume I describes the systems and assesses their compliance with the NEDSS standards.

**Volume II Strategic Plan:** Identifies current business and technical challenges facing the State's public health system. This document presents a strategic vision along with a detailed discussion of the goals, objectives, and strategies to migrate the current environment to one that incorporates NEDSS standards and positions public health activities for continued success.

**Volume III Implementation Plan:** Presents a "road map" for implementing the CalPHIN vision. The Implementation Plan presents prioritized strategies, a plan for early success of CalPHIN, and a foundation for future systems to support disease surveillance and other public health management functions.

## Message from DCDC

---

I am pleased to present the California Public Health Information Network (CalPHIN) Strategic Plan for 2003. This long-term Plan is an integral part of our commitment to protect and improve the health of all Californians. Increasingly, the California Department of Health Services (Department) looks to technology for contributions to solutions for the tough public health challenges facing our State. Information technology, such as the Internet, holds great promise for improving California's public health system as it carries out its mission. In addition, our technology infrastructure and core data are immensely valuable assets that must be well managed to facilitate working relationships with our public health partners. This Strategic Plan presents specific, business-driven goals, objectives, and strategies that we can pursue to leverage technology and data in every way possible to better serve California's public health.

Recent events make this Plan both timely and urgent. These events have dramatically underscored the importance of an effective, comprehensive public health information network that links key information with decision-makers in a timely manner. Business as usual is not acceptable. For this reason, this Strategic Plan provides an essential road map for the CalPHIN initiative in making the right business and technology choices over the next several years. Ultimately, as we proceed in enhancing our public health system and bioterrorism preparedness and response activities, I believe this Plan will help position us to leverage the power of technology more fully to accomplish the CalPHIN vision and support the Department's mission.

The foundational elements of this Strategic Plan include CalPHIN's vision, strategic goals, objectives, and strategies. These elements align with the Department's mission, vision, and key issues, the Division of Communicable Disease Control's major activities, and the Centers for Disease Control and Prevention's Public Health Information Network requirements. Along with key stakeholder input, they serve as the foundation for the CalPHIN initiative's six strategic goals: Leadership, Standards, Collaboration, Enabling Technology, Security/Confidentiality, and Project Success.

Many people contributed to the development of this Plan. We had participation from various DHS organizations, local health departments, and other agencies and departments throughout the State that are a critical part of improving public health. I thank each of you for your contributions of time, effort, and insight. Individually and collectively, you have helped to make the Plan a sound and credible guide for the CalPHIN initiative. By committing to the Plan's goals and strategies, I am confident the CalPHIN effort will effectively utilize collaborative efforts, streamlined processes, and technology to maintain and support the State's public health system for future generations. I look forward to joining with you as we work toward implementing the elements of this Strategic Plan.

---

Mark Starr, DVM, MPVM, Dipl. ACVPM  
Acting Chief

---

(Date)

# Table of Contents

---

<b>Introduction .....</b>	<b>1</b>
The Planning Approach and Methodology .....	4
<b>CDC Initiatives to Integrate Information .....</b>	<b>6</b>
<b>California's Public Health Information Environment.....</b>	<b>9</b>
<b>Current and Future Systems to Support Public Health in California .....</b>	<b>12</b>
Description of Current Activities that Support CalPHIN.....	14
Description of Planned Activities that will Support CalPHIN .....	17
<b>Conclusion.....</b>	<b>19</b>
<b>Appendices.....</b>	<b>21</b>
<b>A. NEDSS Assessment Executive Summary.....</b>	<b>22</b>
<b>B. Project Participants.....</b>	<b>28</b>
<b>C. Public Health Organizations.....</b>	<b>39</b>
<b>D. NEDSS Systems Architecture Version 2.0.....</b>	<b>87</b>
<b>E. NEDSS Candidate Projects.....</b>	<b>91</b>
<b>F. Glossary.....</b>	<b>94</b>

## INTRODUCTION

The mission of the California Department of Health Services (DHS) is to protect and improve the health of all Californians. The DHS recognizes that the effective use of information technology, combined with sound business processes, will allow its workforce to accomplish this mission. The California Public Health Information Network (CalPHIN) Strategic Plan presents an ambitious, multi-year agenda to integrate the contributions of people, processes, and technology to meet current and future challenges of public health programs in the State.

The CalPHIN Strategic Plan is a key product of the State's commitment to support the disease surveillance activities of the Centers for Disease Control and Prevention (CDC) and more efficiently manage public health in California. Specifically, the Plan was initiated to comply with the National Electronic Disease Surveillance System (NEDSS) elements that the CDC recommended be incorporated into all of the states' disease surveillance systems.

In the early stages of the planning process, California recognized that improved surveillance activities included more than the technical components identified in the NEDSS initiative. In fact, during the course of developing this Strategic Plan, the CDC expanded the scope of their initiative and began defining a "network" of activities to support public health surveillance. The CDC's expanded initiative is currently known as the Public Health Information Network (PHIN). Thus, this Strategic Plan incorporates more than just the technology components of the original NEDSS vision. It also addresses important aspects of people and processes and, therefore, aligns with the expanded CDC PHIN initiative.

The Current Environment component of the Strategic Plan provides context and background for understanding the future of CalPHIN, as described in the Strategic Plan itself. The Current Environment includes an overview of the planning process, a description of public health information initiatives at the national level that directly affect the Strategic Plan – specifically within the CDC, a discussion of the public health information environment in California, and a discussion of current and planned activities to support public health in California. A primary purpose of this document is to present the reader with an overview of the State's current technical capabilities and systems and to assess the ability of this technology to meet the NEDSS requirements and support the CalPHIN vision.

### ***The Importance of Quality information to Support Public Health Surveillance***

Public health surveillance is the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding health-related events for use in public health action to reduce morbidity and mortality, and to improve health.<sup>1</sup> As new pressures for early detection of disease outbreaks have arisen, most notably for outbreaks arising from bioterrorism, it is critical that public health officials have timely and accurate information to develop appropriate responses.

The cornerstone of public health systems, at all levels, is timely access to high-quality information for protecting and improving public health. More than ever before, information technology (IT) and complex integrated information systems and databases are needed to fulfill the data and information needs of the public health system. Effective resolution of issues

---

<sup>1</sup> Centers for Disease Control and Prevention. Updated guidelines for evaluating public health surveillance systems: recommendations from the guidelines working group. MMWR 2001;50(No. RR-13).



relating to connectivity, IT infrastructure capacity, bi-directional data and electronic communications, and public health informatics are vital to the success of administering public health.

Health care providers, public health professionals, policymakers, and other public health stakeholders recognize that ready access to relevant, reliable information will greatly improve their ability to address personal and community health concerns. Timely and complete access to surveillance data on abnormal patterns of disease and other public health threats would save lives.

Effective public health surveillance can:

1. Act as an early warning system by detecting microbial, environmental, behavioral, occupational, and other health threats.
2. Concentrate resources, focus interventions in areas of greatest need, and facilitate future projections by tracking and monitoring the incidence, patterns, and trends of disease.
3. Help assess public health measures by providing accurate health information to policymakers.

**“The best initial defense against public health threats ... (is) a strong information-sharing network that protects privacy while seamlessly connecting local, state and federal governments. Moreover, timely and easy access to information is key to applying effective countermeasures.”** Subcommittee on Technology and Procurement Policy Oversight – Battling Bioterrorism

### ***Public Health in California is Supported Through Diverse Organizations***

Public health is supported by an array of Federal, State, and local organizations. These organizations are further divided into functional units that support clinical, health department, laboratory, disease program, and other operational divisions. The complex responsibilities and interactions between these public health partners demand significant coordination of information technology and information sharing methodologies. Cooperation is essential to meet the day-to-day business needs of public health operations as well as bioterrorism and public health preparedness objectives.

At the national level, through the CDC, an effort is underway to streamline the collection, management, and reporting of data – especially for the surveillance of communicable diseases. In 1999, the CDC introduced the NEDSS initiative to promote the use of data and information system standards. NEDSS seeks to advance the development of efficient, integrated, and interoperable disease surveillance systems at all levels of public health administration. In 2002, the CDC introduced the concept of PHIN. PHIN not only supports the common IT standards of NEDSS, but also promotes the sharing of capabilities and the integration of multiple public health systems.

The CDC also develops and maintains IT systems for the surveillance of specific diseases. States and localities have the option to use these systems or to develop customized solutions to meet specific business requirements. California has a combination of CDC-developed systems and customized solutions.

The DHS administers the public health surveillance systems at the State level. The data and information necessary for effective disease surveillance comes from a variety of operational and disease-specific systems. At the State level, the principal disease surveillance activities are epidemiological – that is, disease surveillance from a demographic or population perspective.

The DHS uses data from many systems for their studies and is the primary source of California data submitted to the CDC.

California's 63 Local Health Departments (LHD) have operational responsibility for front-line public health activities in the State. The LHDs have direct contact with providers (physicians, hospitals, and laboratories) that have identified or suspect a disease that meets "public health concern" criteria. The LHDs are also responsible for ensuring that appropriate health services are provided to individuals who contract reported diseases. Finally, the LHDs maintain information about disease outbreaks in appropriate systems and periodically report to the State and the CDC for further disease surveillance purposes.

### ***California is Committed to Improving its Public Health Systems***

In March 2002, the DHS published a five-year Strategic Plan that addresses the critical issues facing the Department, including those related to public health. The Plan directly supports the overall mission of the Department, which is "... to protect and improve the health of all Californians."

The DHS Strategic Plan identifies such issues as optimizing the capacity of public health throughout the State and improving the health status and outcomes of the population. In order to address these and other issues, the DHS Plan discusses the need to improve data and analysis, sharing of programs and services, communication, and technical assistance. The goals of these improvement efforts are to reduce the burden of preventable diseases; address the challenge of bioterrorism and emerging infectious diseases; improve the availability of population-based health data; and support public health integration, consolidation, and simplification efforts.

To help meet these public health goals, the DHS is committed to adopting the NEDSS standards and supporting the PHIN philosophy of sharing information and technology resources among surveillance systems. In 2001, as an initial step towards implementing NEDSS, the DHS Division of Communicable Disease Control (DCDC) engaged Synergy Consulting, Inc. (Synergy) to conduct an assessment of surveillance systems' compliance with the NEDSS criteria. As part of this assessment, specific State-level information systems were evaluated to determine their degree of compliance with the eight NEDSS technical architecture elements. The NEDSS Assessment Executive Summary is located in Appendix A.

As a next step in the process, the DCDC contracted with Synergy to develop a strategic plan for incorporating the NEDSS elements into disease surveillance information systems. The Plan also links the objectives of the NEDSS initiative with the goals set forth in the broader DHS Strategic Plan, and demonstrates how NEDSS will help address important issues described in the DHS Strategic Plan. This report is the first of three volumes that comprise the CalPHIN Strategic Plan.

While developing the CalPHIN Strategic Plan, the focus included the NEDSS technical elements and the business process and governance issues that impact the effectiveness of disease surveillance systems. Since this strategic planning effort in California aligns with the CDC's vision for PHIN, the name of the Plan was changed from NEDSS to CalPHIN.

## ***The Planning Approach and Methodology***

The strategic planning process determines where an organization is going in the future, how it is going to get there, and how it will know when it gets there. Essentially, strategic planning represents the link between a vision for the future and the actions necessary to make that vision a reality.



## ***The Value of Strategic Planning***

The process of developing a strategic plan refocuses the organization's sense of purpose and stimulates future-oriented thinking based on a shared sense of mission. Collaboration among organization members is more effective when everyone is working toward the same goal and shares the same assumptions. The CalPHIN Strategic Plan is the product of a collaborative effort involving public health partners from the local, State, and Federal levels.

If you don't know where  
you are going ... any  
road will get you there

The CalPHIN Strategic Plan was developed with the input and support of a broad representation of public health and technology stakeholders. DHS technology leaders, communicable disease surveillance programs, LHDs, and public health industry groups provided input into the Strategic Plan. A project Steering Committee oversaw the planning process. A list of project participants is included in Appendix B.

## ***The Approach to Creating the CalPHIN Strategic Plan***

The CalPHIN Strategic Planning team used a structured approach to collecting and assessing input and information. The approach included a comprehensive review of documentation from public health programs and systems as well as interviews with a broad cross-section of public health stakeholders from across the State. In interviews with more than 60 individuals or groups, the project team gained an understanding of the current business environment as well as future-oriented strategic and business objectives. The interviews also provided insight into key technology-related and other environmental challenges.

The planning team focused on three areas essential to the success of the CalPHIN effort – governance, process, and technology. In the area of governance, the team reviewed the current structure and culture of public health organizations and defined an organizational framework designed to facilitate a higher degree of integration of business activities and technology. The review of public health processes identified business practices that may be shared across the various organizations that administer public health data. The technology review encompassed the software and hardware infrastructure that currently supports the public health system.

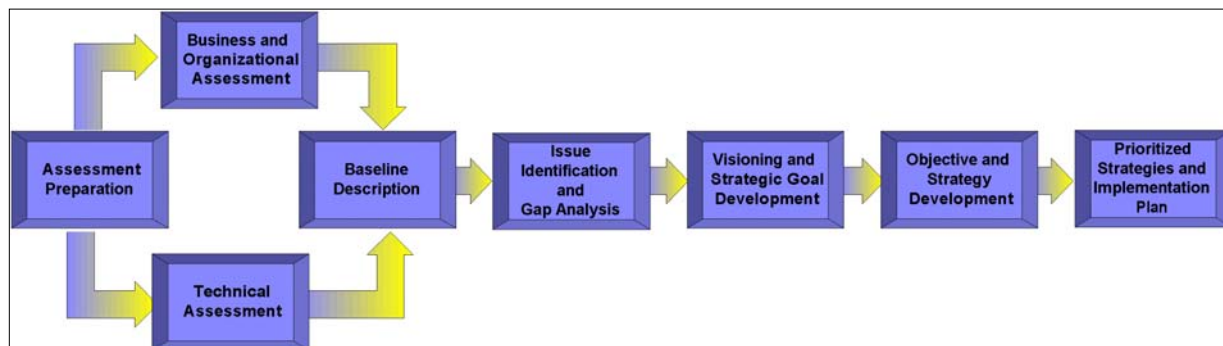
The following activities were included in the development of the Strategic Plan.

- **Current Assessment** – The planning team collected and reviewed documentation on existing and planned public health systems. The primary purpose of this review was to understand the current systems that are used to support both State and local activities. The assessment also included interviews with representatives from key stakeholder organizations throughout the State. These interviews provided a further



- understanding of the systems as well as of the organizations and processes that support public health activities. The review of documentation and the interviews allowed the planning team to formulate a baseline description of the current environment.
- *Identify Issues* – Based on the results of the assessment, the project team identified gaps between the capabilities of existing systems and the ability of the State to achieve the desired results of CalPHIN. In brief, this step allowed the planning team to identify key strengths and weaknesses of the current environment critical to the success of CalPHIN.
  - *Develop a Vision and Strategic Goals* – During this phase, the planning team and public health stakeholders developed an overall vision for the successful integration of public health information. Six goals were identified that will support the realization of the vision.
  - *Develop Objectives and Strategies* – Building on the CalPHIN vision and goals, specific objectives were established as milestones toward achievement of each goal. In addition, specific strategies were developed as action steps toward the achievement of the CalPHIN objectives, goals, and vision.
  - *Prioritize Strategies* – The planning team prioritized the strategies and incorporated them into a five-year plan.

The following diagram illustrated the major activities that guided the strategic planning process for CalPHIN.



**Figure 1. Strategic Planning Activities**

This volume of the Strategic Plan presents the results of the assessment and provides a baseline description of the most significant public health surveillance systems. This information sets the context for the remainder of the Plan.

## CDC INITIATIVES TO INTEGRATE INFORMATION

The mission of the CDC is “to promote health and quality of life by preventing and controlling disease, injury, and disability.” In order to support this mission, the CDC relies on a number of public health surveillance systems that collect data and information related to disease trends, the effectiveness of preventive measures, and the development of strategies to prevent injury and disability.

No single system collects all the information required to support the comprehensive surveillance functions necessary to monitor public health. In order to effectively monitor the public health and understand changing public health conditions, it is necessary to accumulate and analyze information from a variety of sources. The CDC has long recognized that there are inefficiencies and barriers inherent in the current array of public health surveillance systems. Consequently, in 1996 the CDC established the Health Information and Surveillance Systems Board (HISSB) to formulate and enact policy “...concerning the planning, development, maintenance, and use of public health information and surveillance systems.”

### *The Development of NEDSS*



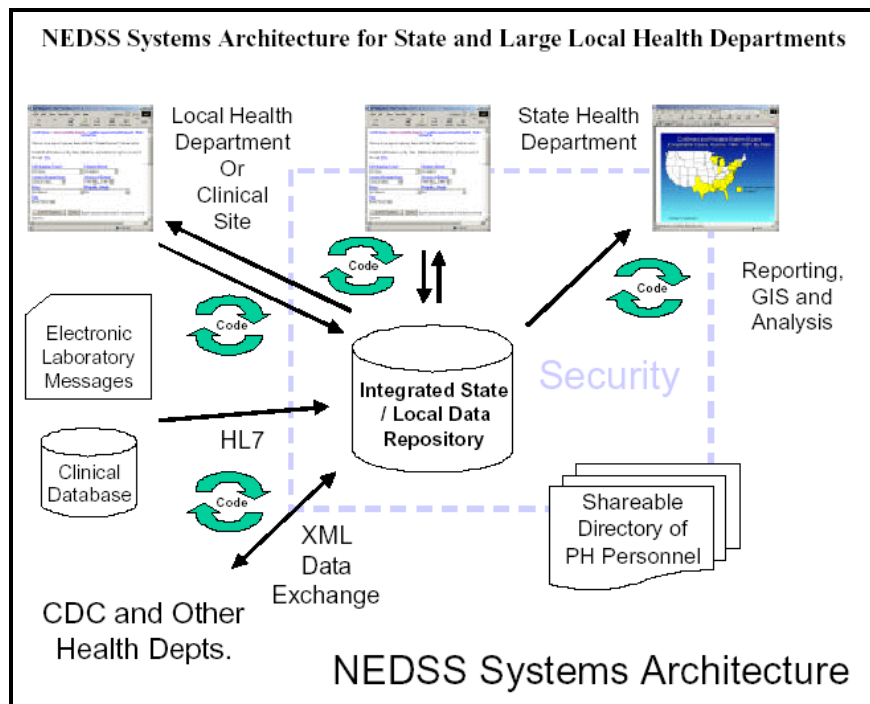
In 1999, the HISSB created the NEDSS project as a way to improve and integrate existing disease surveillance systems. The NEDSS project is intended to provide a framework for integrating surveillance activities throughout the country. The ultimate goal is to facilitate more accurate and timely reporting of public health threats, such as outbreaks of infectious diseases and bioterrorist events.

The CDC’s NEDSS mission is to design and implement seamless surveillance and information systems so that public health professional have access to the best and most timely information for monitoring public health. The CDC designed the NEDSS initiative to (1) facilitate the electronic transfer of appropriate information from clinical information systems used in the delivery of health services to public health departments; (2) reduce the burden on health service providers of collecting and reporting such information; and (3) enhance the timeliness and quality of public health information.

Under the NEDSS initiative, public health systems will adopt industry standards that promote the sharing of technology and facilitate the exchange of information between various surveillance systems. The CDC identified eight architectural elements that should be incorporated into surveillance systems to integrate public health information:

1. Conduct and support web browser-based data entry and data management
2. Accept, route, and process electronic HL7 messages containing laboratory, clinical, and public health content
3. Implement an integrated data repository
4. Develop active data translation and exchange (integration broker) functionality
5. Utilize contemporary application programming practices - component based, object oriented, and cross platform, where possible
6. Develop data reporting and visualization capability
7. Implement a shareable directory of public health personnel
8. Implement a security system and appropriate security policies

The CDC published the following diagram (Figure 2) to illustrate the interdependence of the eight elements into the NEDSS systems architecture.



**Figure 2. NEDSS Systems Architecture**

### ***The Goal of NEDSS***

The implementation of NEDSS will enable local, State, and Federal public health stakeholders to better:

- Monitor and assess disease trends
- Guide prevention and intervention programs
- Inform public health policy and policy makers
- Identify issues needing public health research
- Provide information for community and program planning
- Protect confidentiality while providing information to those who need to know

Specifically, the CDC's goals for NEDSS are to:

- Emphasize, adopt, and promote national standards for the electronic exchange of information
- Foster integration of surveillance and health information systems
- Support the development of surveillance systems according to a defined information systems architecture
- Develop direct electronic communications between sources of data (such as health care providers or laboratories) and public health agencies
- Facilitate ready exchange of data, as appropriate, between local and State health departments, among states and between states and the CDC

- Ensure security and confidentiality of public health surveillance information in accordance with the Health Insurance Portability and Accountability Act (HIPAA) and state regulations

### ***The Expansion of NEDSS Philosophy to PHIN***

With the events of September 11, 2001, and other threats of bioterrorist activity, clear lessons have been learned about the critical importance of public health and disease surveillance. While the CDC had already identified the need for core interoperability standards, such as those included in the NEDSS initiative, it subsequently expanded its vision to address broader bioterrorist and non-bioterrorist public health information needs. In order to achieve this broader vision, the CDC moved beyond the NEDSS architectural elements and adopted a philosophy of system integration and resource sharing.

In late 2002, the CDC introduced the concept of the PHIN. The PHIN will provide a single network of information that functionally and organizationally integrates public health partners across the country. PHIN includes specific CDC initiatives that suggest the importance of this type of public health information technology integration. These include NEDSS, the Health Alert Network (HAN), the Laboratory Response Network (LRN), the Epidemic information Exchange (EPI-X), and the redesign of the CDC web site for public information and public health education.

### ***The CDC PHIN and California***

While California is not necessarily implementing specific CDC PHIN systems, the State realizes the importance of, and need for interoperable systems that can share information across public health functions and organizations. For example, California is implementing its own HAN solution and is developing a system to collect laboratory transactions in support of surveillance activities. As California continues to enhance its public health surveillance capabilities, the State must also create an integrated, interoperable network of public health information systems. This concept is a central element of the CalPHIN Strategic Plan and will enable California to create a collaborative, integrated public health system.

# CALIFORNIA'S PUBLIC HEALTH INFORMATION ENVIRONMENT

In order to chart a new future, organizations must know where they stand today. Thus, an internal assessment of current capabilities and infrastructure provides an organization with a baseline against which to plan for the future. Such a baseline allows organizations to determine where change is needed in order to fulfill a mission or achieve a vision. Specifically for this Plan, the Current Assessment documents the public health organizational and technological environment today. It also identifies current activities and initiatives that can be leveraged to support the CalPHIN vision. The Current Assessment also describes issues and constraints that could prevent the State from achieving the vision. Background information is presented in this volume, while a thorough discussion of the strengths, weakness, and opportunities of the current public health environment is presented in Volume II.

## ***California's Public Health Operates in a Diverse Environment***

California is unique in the way it administers public health programs. In most states, the administration and operation of public health occurs at the state level, with services being delivered or monitored through a network of local field offices of the state agency. In California, by contrast, the programs are administered at the state level, but operational and service delivery responsibilities reside at the local (county or city) level. California has 61 LHDs – 58 counties and 3 cities – that provide specific public health services. These LHDs have a high degree of autonomy in determining how services are delivered.

The distinct roles and responsibilities of the State and the LHDs in California, as well as the State's large population and complex demographics, create many challenges for the administration of public health programs. For example, the implementation and use of shared public health systems is quite difficult in such a decentralized environment. As a result, the State's public health programs have developed many similar systems that meet the needs of individual programs or LHDs. Depending on the size and needs of the individual LHDs, some do not use automated systems, while others use systems developed by the State or CDC. The largest LHDs use their own sophisticated systems that integrate operational and surveillance information.

The diversity of organizations and systems that support public health administration in California is mirrored by the range of stakeholders that contributed to this assessment. More than 20 organizations and seven systems that support disease surveillance and public health administration were involved. The table on the following page lists the organizations, both DHS and non-DHS, that contributed to the assessment. Appendix C presents a comprehensive description of the organizations and their public health activities.



## State Level DHS Organizations

- Infectious Diseases Branch (IDB) [formerly Disease Investigations and Surveillance Branch]
- IDB Surveillance and Statistics Section
- Tuberculosis (TB) Control Branch
- Sexually Transmitted Disease (STD) Control Branch
- Office of AIDS
- Immunization Branch
- Microbial Disease Laboratory (MDL)
- Viral and Rickettsial Disease Laboratory (VRDL)
- Refugee Health Section
- Childhood Lead Poisoning Prevention Branch
- Environmental Health Investigations Branch

- Center for Health Statistics
- Bioterrorism Surveillance and Epidemiology Team
- California Cancer Registry
- Genetic Health Branch
- Office of HIPAA Compliance
- Information Technology Services Division (ITSD)
- ITSD, Project Planning and Management Branch
- ITSD, Information Security Office

## Other DHS and Non-DHS Organizations

- Office of Statewide Health Planning and Development
- Health and Human Services Data Center
- Local Health Departments
- California Conference of Local Health Data Management
- EpiForum

As a result of this complex and diverse environment, California's public health information systems suffer from the following problems:

- **Data cannot be shared easily.** The existing technical and organizational infrastructure does not allow public health programs and LHDs to share or exchange data easily or in a timely manner.
- **Data is fragmented.** Data tends to be divided into silos. For example, multiple programs – such as the STD Program, the TB Program, and the Acquired Immune Deficiency Syndrome (AIDS) Program – that use unrelated systems, may maintain data about individuals or groups.
- **Analysis of data may be incomplete.** Data is not uniformly available in the various systems. The lack of a standard method for collecting, storing, and accessing data makes it difficult to identify trends, variations, and linkages between and among diseases and populations.

***California's Commitment to CDC Efforts to Integrate Public Health Information***

As the need for more flexible, interoperable, and secure public health systems in California increases, many concepts are under consideration for systems that meet the multiple requirements of the State's public health programs, LHDs, and the CDC. In general, these concepts build on the standards promoted by the CDC. California both supports and has contributed to the standards and initiatives of the CDC. The State's current development and planning efforts (including this strategic planning effort) demonstrate the State's commitment to creating an integrated system that efficiently provides the information needed to protect the public health of all Californians. Figure 3 illustrates activities undertaken in California in response to key CDC initiatives, including NEDSS.

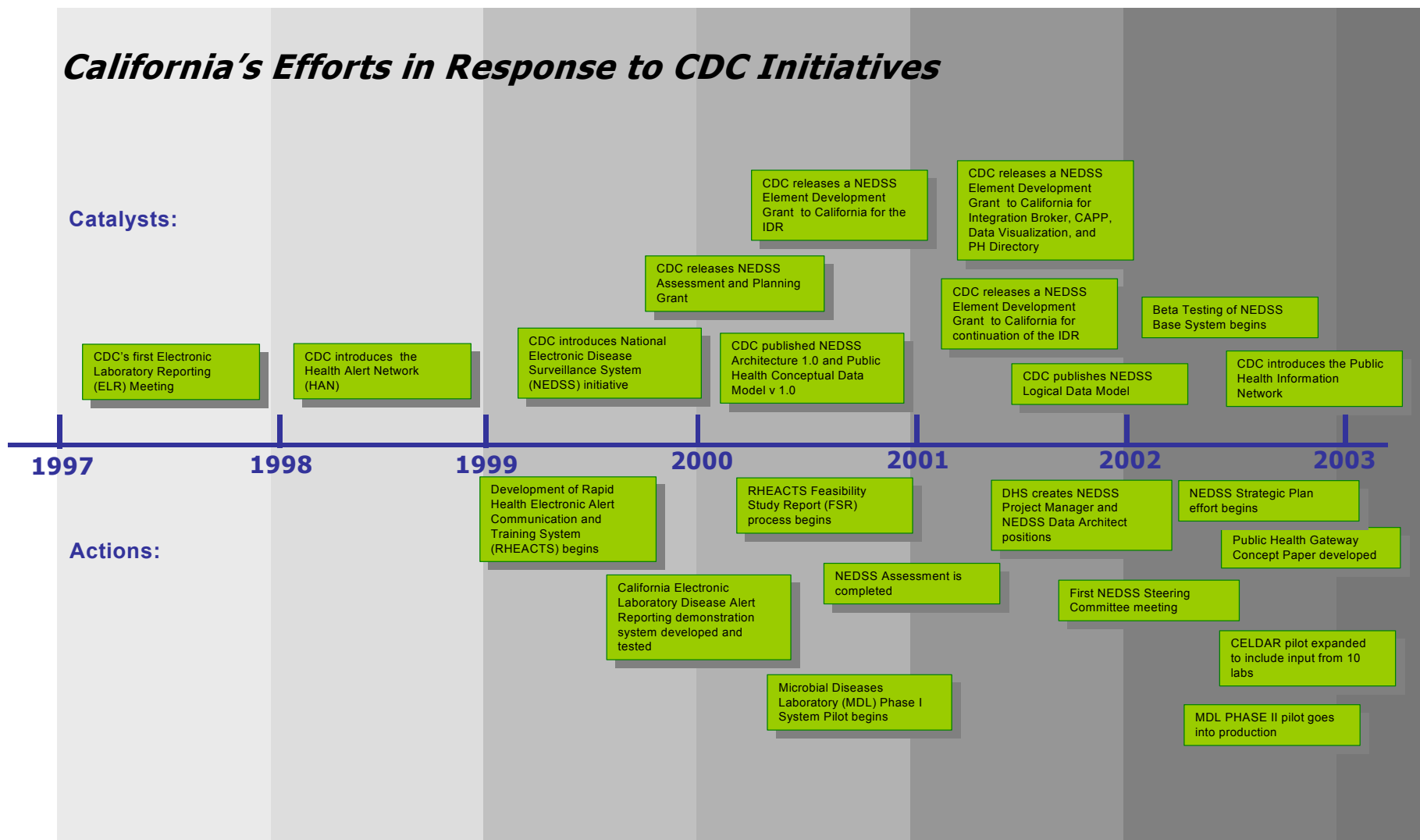


Figure 3. California NEDSS Activities

# CURRENT AND FUTURE SYSTEMS TO SUPPORT PUBLIC HEALTH IN CALIFORNIA

A variety of systems – both planned and in production – support the current and future disease surveillance and public health system needs of California. During the assessment phase of the planning process, the project team collected information about, and evaluated these systems.

## ***Evaluation of Existing Systems with the NEDSS Architecture***

The planning team completed a technical evaluation to determine if current public health systems incorporate the NEDSS architectural elements, as defined in the NEDSS System Architecture Version 2.0. Figure 4 identifies the systems that were evaluated. These systems were selected based on their importance to disease surveillance and, in most cases, are a primary source of critical public health information.

System Name	DHS Branch	Developer
Automated Vital Statistics System/Communicable Disease Management System (AVSS/CDMS)	IDB, Immunization Branch, and STD Control Branch	UC Santa Barbara and Atlas Development
California Electronic Laboratory Disease Alert and Reporting System (CELDAR)	Division of Communicable Disease Control, Surveillance and Statistics Section	The SIMI Group
HIV/AIDs Reporting System (HARS) and e-HARS (planned)	Office of AIDS	CDC
Microbial Disease Laboratory System (MDL) II Phase I and MDL II Phase II (pilot)	Microbial Disease Laboratory	DHS, Information Technology Services Division (ITSD) and the SIMI Group
Response and Surveillance System for Childhood Lead Exposures Phase II RASSCLE II (planned)	Childhood Lead Poisoning Prevention Branch (CLPPB)	CLPPB
Refugee Health Electronic Information System (RHEIS)	Refugee Health Section	DHS, ITSD
Tuberculosis Information Management System (TIMS)	TB Control Branch	CDC

**Figure 4. DHS Disease Surveillance Systems**

A detailed description of each system, including their technical components, is included in Appendix C. The NEDSS Systems Architecture Version 2.0 is presented in Appendix D. A summary of the evaluation is presented in “Figure 5 – NEDSS Element Assessment” on the following page.

NEDSS Elements	DHS Surveillance Systems								
	AVSS/ CDMS	CELDAR	e-HARS	HARS	MDL II Phase I	MDL II Phase II	RASSCLE II (Planned)	RHEIS	TIMS
a. Conduct and support web browser-based data entry and data management	○	●	●	○	⊙	●	—	●	○
b. Accept, route, and process electronic HL7 messages	○	⊙	⊙	⊙	⊙	⊙	●	○	○
c. Implement an integrated data repository	○	●	⊙	○	○	⊙	●	⊙	○
d. Develop active data translation and exchange functionality	○	●	⊙	⊙	○	⊙	●	○	○
e. Utilize contemporary application programming practices	○	⊙	●	⊙	⊙	⊙	—	●	○
f. Develop data reporting and visualization capability	⊙	⊙	⊙	○	⊙	●	⊙	⊙	⊙
g. Implement a shareable directory of public health personnel	○	⊙	⊙	○	○	⊙	⊙	○	○
h. Implement a security system and appropriate security policies	○	⊙	⊙	⊙	○	⊙	●	⊙	○

Figure 5. NEDSS Element Assessment

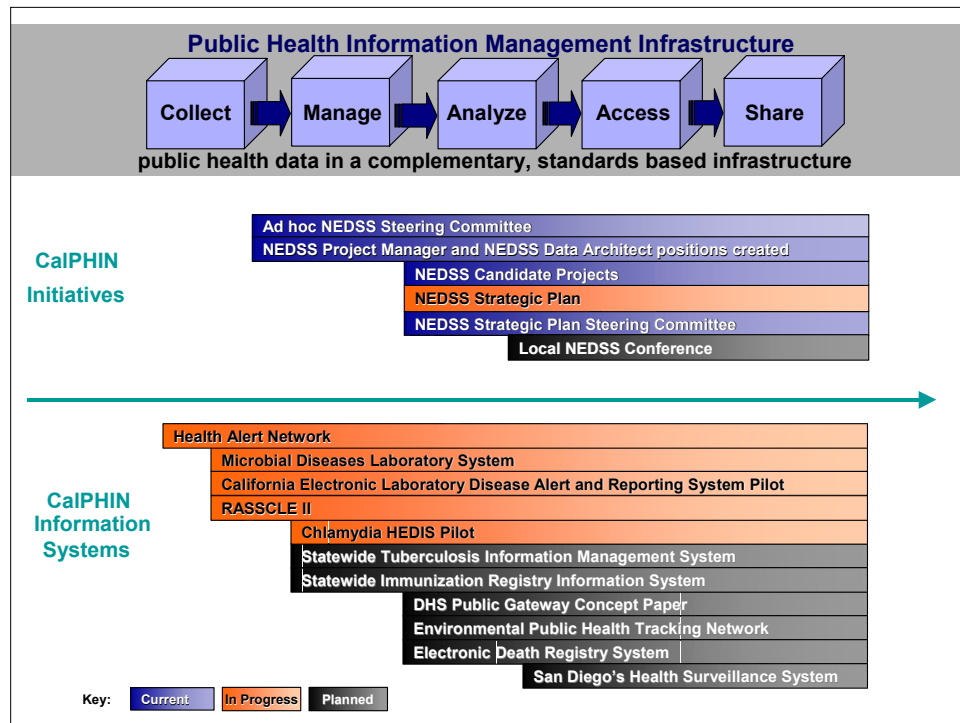
## Key

- Supports NEDSS system element
- ⊙ Partially supports NEDSS system element
- Does not support NEDSS system element
- Unknown

### **Summary of Development and Planned Activities to Support CalPHIN**

The planning team focused on three aspects of the CalPHIN effort – (1) governance and organization, (2) business process, and (3) technology. The following sections describe current and planned CalPHIN activities within the selected public health systems in California. Each section describes organizational and business process activities and technology initiatives. Note that some of the activities refer to NEDSS and have not yet changed to the CalPHIN name.

The following diagram provides a summary of the current and planned activities.



**Figure 6. CalPHIN and NEDSS Activities**

### **Description of Current Activities that Support CalPHIN**

This section describes current CalPHIN-related activities, including business and organizational initiatives and information system development efforts. These activities are underway throughout the State and are not necessarily coordinated at any level. A number of the activities relate to the implementation of specific NEDSS elements.

#### **Business and Organizational Activities**

**Creation of the NEDSS Steering Committee.** The DCDC created the NEDSS Steering Committee to provide overall guidance and direction for DHS's NEDSS efforts. The Committee's broad-based membership includes DHS senior managers as well as representatives from various public health programs, LHDs, and industry groups. A list of Steering Committee members is presented in Appendix B.

The initial focus of the group was to facilitate the exchange of public health information throughout the State. Originally referred to as the California Electronic Data Integration Initiative



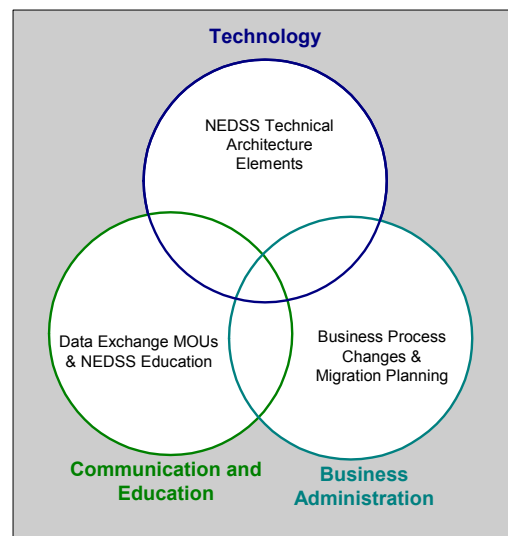
(CEDII), the CEDII has been expanded to include many aspects of the CalPHIN strategies. The Steering Committee has adopted the vision of CalPHIN and now leads the statewide effort to support this initiative.

The Steering Committee's charter encompasses the following concepts:

- Oversee progression of DHS and LHD information systems towards NEDSS compliance
- Highlight opportunities and risks
- Approve project scope
- Educate other DHS and LHD programs on NEDSS
- Encourage collaboration

**Initial Definition of California's NEDSS Product.** One of the initial NEDSS Steering Committee's work products defined an approach to developing systems that incorporate the NEDSS elements. According to this definition, NEDSS-based systems would include the following:

- NEDSS Technical Architecture elements
- Business process changes with NEDSS system implementations, including migration planning for laboratories and LHDs
- NEDSS Education, including data standards, benefits of collaboration, and best practices
- Data exchange between program areas, including Memoranda of Understandings or Informal Agreements
- Communication



**Creation of NEDSS Project Manager and NEDSS Data Architect positions.** To assist in the coordination of NEDSS activities, the DHS added two staff positions to its organization. The NEDSS Project Manager and NEDSS Data Architect provide guidance to the overall California NEDSS effort.

**Development of NEDSS Candidate Projects.** The NEDSS Steering Committee identified 18 potential NEDSS projects. The candidate projects are organized into the following categories:

- Data Standards and Information Requirements
- Architecture
- Communication and Education
- Software Implementation Projects

Appendix E includes descriptions of the eighteen NEDSS candidate projects. The NEDSS Steering Committee will apply specific selection criteria (e.g., cost, political impact) as well as

the results of this Strategic Plan to guide the prioritization and selection of NEDSS-related projects.

**Initiation of the NEDSS (CalPHIN) Strategic Plan.** In June 2002, the DCDC initiated the NEDSS strategic planning project to create a common vision for NEDSS in California and a consensus on specific goals and objectives. In order to support the broader objectives and philosophy of the CDC PHIN effort, the strategic plan is now referred to as CalPHIN and incorporates the governance, business process, and technology components of public health programs.

**Creation of the NEDSS (CalPHIN) Strategic Plan Steering Committee.** To support the CalPHIN strategic planning effort, a subset of the NEDSS Steering Committee formed a NEDSS Strategic Plan Steering Committee. This Steering Committee provides oversight and direction for the strategic planning project. The Committee maintains project focus and direction, and ensures that the project stays on track, according to defined goals, requirements, and deliverables. Appendix B identifies the members of the NEDSS Strategic Plan Steering Committee.

### ***Information System Development Efforts***

This section discusses the information system development efforts in California that support the NEDSS architecture and CalPHIN activities. These information systems are being built with industry standard technology as opposed to “proprietary architecture designed specifically for a single purpose.”

#### **California Electronic Laboratory Disease Alert and Reporting (CELДАР) System Pilot.**

The DCDC is implementing a pilot to demonstrate the feasibility of collecting electronic laboratory reports in a consolidated reporting environment and generating disease alerts based upon established business rules. The pilot will focus on laboratory test results mandated by regulation and other specified diseases of a bioterrorist concern. As depicted in Figure 5, CELДАР partially or fully supports all eight NEDSS systems elements.

**Microbial Diseases Laboratory (MDL) II Pilot.** The MDL is the reference microbiology laboratory for all local and county public health laboratories in California. In addition, the MDL is the support laboratory for the DCDC for the diagnosis of bacterial, parasitic, and fungal infections. The MDL II Pilot is a web-based system that automates the laboratory specimen submittal and tracking process. As depicted in Figure 5, MDL II partially or fully supports all eight NEDSS systems elements.

**Health Alert Network (HAN).** The State is currently implementing a solution to meet the requirements of the CDC’s HAN initiative. The project began as the Rapid Health Emergency Alert Communication and Training System (RHEACTS) pilot and has evolved into the California HAN (CAHAN) project. The BioTerrorism Readiness Suite (BTRS)<sup>2</sup> is currently in a pilot mode and will incorporate many of the NEDSS elements. Most notably, CAHAN provides a public health directory that may be re-used for future projects.

**Los Angeles’ Health Alert System Training and Education Network (HASTEN).** HASTEN is Los Angeles’ response to the CDC’s HAN requirements. HASTEN also incorporates a number of the NEDSS systems elements through the implementation of the BTRS application.

---

<sup>2</sup> BTRS is a proprietary HAN solution developed by Virtual Alert.

## ***Description of Planned Activities that will Support CalPHIN***

This section describes planned activities, including business and organizational initiatives and information system development efforts that will support NEDSS and CalPHIN efforts in California.

### ***Business and Organizational Activities***

**Local NEDSS Conferences.** DHS received CDC funding to produce a NEDSS educational conference for the California LHDs. The NEDSS Steering Committee and a variety of public health organizations and LHDs are planning the conferences. The conferences will take place in locations throughout the State to allow all LHDs to learn about NEDSS and CalPHIN and participate in the planning of projects that will improve operational effectiveness and efficiency.

### ***Information Systems Development Efforts***

#### **Response and Surveillance System for Childhood Lead Exposures Phase II**

**(RASSCLE II).** The CLPPB is planning to develop a new information system to replace their current legacy system, RASSCLE. The CLPPB's RASSCLE II FSR has received full control agency approval. The Branch is preparing to release a Request for Proposals (RFP) to select a vendor to develop the system.

#### **Chlamydia Health Plan Employer Data and Information Set (HEDIS) information System**

**Pilot.** The STD Control Branch is developing a pilot information system that will electronically capture chlamydia laboratory test data to aid managed care organizations in the calculation of their Chlamydia Screening HEDIS measures. As depicted in the Figure 5, this system supports many of the NEDSS systems elements.

**Statewide Tuberculosis (TB) Information Management System.** The TB Control Branch is planning to develop a new information system to replace their current legacy system, TIMS. The TB Control Branch is researching development options, including the use of another state's information system and the development of a custom system.

**Statewide Immunization Information System (SIIS).** Currently, providers and health plans use registry software to enter immunization data and send records to regional registries. The Immunization Branch is planning to develop a state hub to link the regional registries and unify the system statewide. The Immunization Branch plans to have all SIIS regions and a state hub production-ready and tested by the end of 2003. The Immunization Branch plans to incorporate NEDSS standards in the development of the SIIS.

**Public Health Gateway Concept Paper.** The CalPHIN Steering Committee developed a concept paper to undertake a Public Health Gateway Project. This project would provide county and State public health professionals with a Web-based gateway to multiple DHS extranet applications, including an advanced security infrastructure to meet federal guidelines. The project will enable DHS to properly secure Internet-based applications, and provide a gateway for DHS extranet applications to enable secure reporting, management, analysis, and dissemination of public health data.

**Environmental Public Health Tracking Network.** The Environmental Health Investigations Branch (EHIB), in collaboration with the California Environmental Protection Agency (Cal/EPA) and the University of California system, is planning the development of an Environmental Public

Health Tracking Network (EPHTN). The EHIB plans to align EPHTN with the DHS's CalPHIN initiative.

**Electronic Death Registry System.** The Center for Health Statistics (CHS) is planning to develop an Electronic Death Registry System (EDRS) to collect death certificate data. The CHS is working to incorporate the NEDSS standards, where possible.

**San Diego's Proposed Health Surveillance / Early Recognition System.** The San Diego LHD is planning to develop a surveillance and early recognition system that will incorporate several elements of the NEDSS Systems Architecture.

## CONCLUSION

The Current Environment assessment focused on the systems that are in place or under development to support public health administration in general and disease surveillance in particular. Volume II, CalPHIN Strategic Plan, assesses the technological capabilities, leadership structures, and supporting business processes that will be required to achieve the CalPHIN vision. In addition, Volume II of the strategic planning effort includes a comprehensive analysis of the strengths and weaknesses of existing public health systems and external opportunities and threats to achievement of the CalPHIN vision. The following paragraphs summarize the key points made in this Current Environment assessment.

### ***Awareness of CDC Initiatives and State Activities is Increasing***

The DCDC has made a significant effort to educate DHS stakeholders on the existence and value of CDC efforts to create an integrated public health environment. And, more importantly, how California will benefit from implementing and supporting these efforts. With the creation of the NEDSS Steering Committee, California has a forum at which State and local public health officials can share ideas and plan for the future of public health administration in California. The Committee has opened channels of communication that did not previously exist, and provided an opportunity for all members to learn about the NEDSS and PHIN initiatives, to discuss public health program activities, and to share input for decision-makers to use in planning future development activities.

Primarily through the efforts of the Steering Committee, the public health programs participating in the strategic planning effort are, for the most part, aware of California's NEDSS/CalPHIN efforts. This awareness has come from participation in steering committees, presentations at industry conferences, and general communications from the State and the CDC. However, most of these programs have not performed a comprehensive analysis to identify initial issues with implementation, or determined which of their programs, functions, and information systems support the NEDSS standards. There is a desire of the programs for the State to take the lead in creating a plan to accomplish the analysis and provide direction in evaluating the results.

### ***There is No Comprehensive Effort to Create Systems that Align with CalPHIN***

While current public health systems allow programs to meet their specific operational responsibilities, there is a desire among these stakeholders to improve the integration of cross-functional systems and activities to take advantage of the benefits of shared information and technical resources. The NEDSS standards and PHIN vision provide the opportunity for California's public health systems to create such an environment

A few State programs and LHDs have performed preliminary NEDSS analyses, identified initial implementation issues, and determined which programs, functions, and information systems support the NEDSS standards. In addition, a few of California's public health programs have started, or completed, project plans to begin information systems development efforts. However, there is no consistent approach or coordinated effort to incorporate CalPHIN elements into new systems. As a result, there are no existing systems that meet all the criteria of the NEDSS architecture. While some of the recent development efforts incorporate elements of NEDSS, they are not integrated to share processes and technology that will provide the substantial benefits of a coordinated NEDSS and CalPHIN effort.



Three public health programs (TB, STD, and IDB) and two LHDs (Los Angeles and San Diego), participated in this planning effort, and are attempting to coordinate their future development efforts with the NEDSS Systems Architecture standards. Other programs and LHDs are eager to learn more about future projects, determine how they can participate, and ultimately reap the benefits of coordinated, standardized systems, and business processes.

***There is a Need for an Integrated Network of People, Processes, and Technology to Support Public Health in California***

The public health infrastructure is the foundation that supports the planning, delivery, and evaluation of public health activities. Public health requires a proper infrastructure to prepare for an appropriate response to public health threats and emergencies (e.g., bioterrorism attacks). Public health surveillance systems are key to this infrastructure and provide critical information to monitor and, if necessary, change public health policy and activities. With the increased awareness of a possible bioterrorist event and emerging disease management techniques, there has been a renewed emphasis to focus on the timeliness and accuracy of public health surveillance programs. The information required to provide this support may reside in multiple sources and is not readily available to support critical needs of public health.

The DCDC leads the effort within DHS to standardize and improve surveillance systems. There is a cross-program commitment to incorporate the NEDSS architecture into public health systems and involve a wide range of stakeholders in planning. This commitment is demonstrated through the NEDSS/CalPHIN team (project sponsor, project manager, and data architect) providing the structure, and making an effort, to solicit and incorporate input from a wide range of stakeholders. The input from steering committees, regional meetings, and operational staff will create an environment that positions the DHS to meet the diverse needs of public health within the State. In addition, the DCDC is sponsoring this strategic planning effort in order to provide the guidance necessary to identify the appropriate governance and projects for continuing the cooperative effort between public health stakeholders.

## APPENDICES

The CalPHIN Current Environment includes the following appendices:

- A. NEDSS Assessment Executive Summary
- B. Project Participants
- C. Public Health Organizations
- D. NEDSS Systems Architecture Version 2.0
- E. NEDSS Candidate Projects
- F. Glossary

## A. NEDSS ASSESSMENT EXECUTIVE SUMMARY

The purpose of public health surveillance is to monitor and prevent communicable diseases, as well as inform public health professionals and the public as to the status of threatening disease trends or events. Within California, there are 62 local health departments (LHD) that are charged with public health surveillance activities. The LHDs consist of 58 counties and the cities of Berkeley, Long Beach, Pasadena, and Vernon. These LHDs share a variety of systems or have developed unique applications to meet their specific surveillance needs. While surveillance methods may differ, the programs that track specific diseases do share common practices related to the data collected as part of the process.

In order to streamline surveillance systems and take advantage of common practices, as well as better utilize modern technology and standards, the Centers for Disease Control and Prevention (CDC) is implementing the National Electronic Disease Surveillance System (NEDSS). The eight criteria that comprise the NEDSS requirements relate to data architecture, user interface (UI), software architecture, reporting tools and a secure data transfer environment.

The CDC recognizes that no single surveillance system will capture all of the information required to adequately monitor public health. Consequently, distinct systems will remain in place to support specific programs or diseases. The value of NEDSS will be the implementation of overarching standards to allow various systems to more easily share data, allow users to navigate between systems using a similar UI, share software and provide a single, secure method of reporting.

The California Department of Health Services (DHS) engaged Synergy Consulting, Inc. (Synergy) to assess the State's surveillance systems for compliance with the NEDSS standards and provide a high-level implementation plan to address the identified gaps.

### **Assessment of Surveillance Systems**

Under the guidance of the Division of Communicable Disease Control (DCDC), within DHS, Synergy reviewed the systems that support the surveillance activities of Sexually Transmitted Diseases (STD), Tuberculosis (TB), and General Communicable Diseases (GCD), including vaccine-preventable diseases. Synergy also reviewed support systems related to laboratory results reporting and refugee health assessments that are a source of input into specific disease surveillance activities, as well as health alerts that may result from predetermined criteria of disease monitoring. This assessment excluded systems that monitor Acquired Immune Deficiency Syndrome (AIDS).

The surveillance systems that support disease monitoring rely upon multiple automated applications to collect and report data. The assessment focused on eight State-level systems and three county or local-level systems. The appropriate State surveillance systems were reviewed for compliance with the NEDSS criteria and the others were reviewed, including the county systems, to determine capabilities that may be valuable to incorporate into the State's implementation of NEDSS compliant elements.

As part of the baseline assessment of the systems, Synergy analyzed the overall business process and how the system applications and technology support surveillance activities. In order to facilitate data collection, a survey was created and distributed to key stakeholders. The

results of this survey, along with discussions with system experts, yielded business and technical descriptions of systems. We also participated in system demonstrations of each application, as well as architectural reviews that were incorporated into the evaluation.

A summary of system compliance with each NEDSS element is presented in the following table. The "Systems Assessed" section depicts the systems validated for NEDSS compliance. The "Systems Reviewed" section denotes the systems evaluated to determine if capabilities could be used for future NEDSS compliance efforts.

NEDSS Element	Systems Assessed				Systems Reviewed					
	TIMS	AVSS	MDL	CDMS	RHEIS	RHEACTS*	CHARTS	VCMR	CaseLog	CELDAR*
a. Conduct and support web browser-based data entry and data management	No	No	Yes	No	Yes	Yes	No	No	No	N/A
b. Accept, route, and process electronic HL7 messages containing laboratory and clinical content	No	No	Partial	No	No	N/A	No	Partial	No	Yes
c. Implement an integrated data repository	No	No	N/A	No	No	N/A	Yes	Partial	Partial	Partial
d. Develop active data translation and exchange (integration broker) functionality	No	No	Partial	No	No	Partial	Partial	Partial	No	Partial
e. Develop transportable business logic capability	No	No	Partial	No	Yes	Yes	Partial	Partial	No	Partial
f. Develop data reporting and visualization capability	Yes	Yes	Partial	Yes	Yes	Partial	Yes	Yes	Partial	Partial
g. Implement a directory of public health personnel	No	No	No	No	No	Yes	Partial	No	No	N/A
h. Implement a security system and appropriate security policies	No	No	No	No	Yes	Yes	Partial	Partial	No	No

\* In development, pilot phase completed

## AVSS/CDMS

The Automated Vital Statistic System (AVSS) and Communicable Disease Management System (CDMS) systems enable the data collection and distribution of GCD, STD and Immunization (IZ) information. The State gathers GCD, STD and IZ morbidity information through a variety of distinctly different channels, including electronic transmission and paper-based submission of data. In order for the State to publish uniform and consistent reports, multiple resources are used to write SAS scripts, translate disparate disease codes, and accept faxed Confidential Morbidity Report (CMR) submissions from smaller counties. The systems supporting the GCD, STD and IZ programs do not comply with most of the CDC requirements.

In addition to non-compliance with specific NEDSS criteria, the following issues related to GCD, STD and IZ surveillance processes were identified:

- Data collection and distribution is varied and complex. Information is collected and reported to LHDs and the State in a variety of ways.
- There may be delays in reporting statewide occurrences of STD or GCD outbreaks. While an epidemic may be identified in a specific county, the differences in data coding and reporting standards do not allow for quick notification of a multi-county problem.

- There is excessive cost in developing and maintaining surveillance systems. There is little or no coordination between other programs and LHDs to share common business logic or technology that may be reused to save time and development resources.

## **TIMS**

The CDC-developed Tuberculosis Information Management System (TIMS) is installed in 19 counties for the sole purpose of collecting tuberculosis information. TIMS has six modules; however, only three are routinely used in California. The CDC does not allow modification of its source code for state-specific functional enhancements. In response to this, several large counties have created their own tuberculosis information systems to satisfy local requirements. The systems supporting the TB program, including TIMS, do not comply with most of the CDC NEDSS requirements.

In addition to non-compliance with specific NEDSS criteria, the following issues related to TB surveillance processes were identified:

- TBCB has not addressed statewide TB information system needs and has not promoted consistent TB surveillance capabilities among counties. There is no coordinated effort in system development or implementation, which results in duplicate effort and inconsistent system utilization.
- There is an inability to modify TIMS to meet State and LHD requirements. The State has no direct control over system enhancements to meet specific processing and reporting needs or to provide standardization for important non-RVCT data elements.
- Transfer of TB case information may be delayed if a patient moves between counties. There is no easy or expedient way to electronically transfer case information between LHDs if a TB patient moves between counties in the middle of the case management process.
- There is a cost of duplicate entry of data in local systems. In order for larger counties to monitor and manage TB cases, the LHDs re-enter the TIMS information into a local TB specific system as well as summary data into their local AVSS application.

## **Other Systems**

In addition to the surveillance systems mentioned, we reviewed other applications that may be leveraged to incorporate NEDSS compliant functions in future systems. DHS has developed specific NEDSS capabilities in different systems that are either in production or in development.

The Microbial Disease Laboratory (MDL) system is a web-based laboratory specimen-tracking tool. Since the MDL system continues to undergo enhancements and development, it has both production and test functionality. The production portion of MDL supports web-based data entry through the DHS Intranet. The test portion of MDL converts MDL data to HL7 format, using LOINC and SNOMED codes, into a data repository. While a combination of the MDL test and production systems meet some of the NEDSS criteria, the existing system does not comply with most of the CDC NEDSS requirements.

The California Electronic Laboratory Disease Alert and Reporting (CELDAR) system is a prototype data repository designed to provide alerts to health professionals regarding public health threats. It is positioned to accept messages from MDL, and other laboratory systems, store the information and generate appropriate alerts based on pre-defined business rules.



Once again, not all of the NEDSS criteria are met, but it does offer compliance with some of the criteria.

### **General Findings**

Specific findings were also identified that pertain to surveillance activities in general. These include:

- There is not a broadly supported strategic vision of surveillance activities. Currently, there are fragmented and varied approaches with regard to disease surveillance on a local, State and federal level.
- There does not appear to be an all-encompassing statewide funding strategy to address the local and State needs of surveillance systems.
- There is no centralized support of surveillance applications. There is minimal coordination between LHDs to share systems or expertise that may be duplicated with other similar departments. At the State-level, there is no common support or architecture for surveillance systems.
- There is no simple method to track co-morbidity between surveillance systems. The different surveillance systems within the State do not share common access, data standards, data management or reporting capabilities. The systems also do not have the capability to share data and information on a single individual.
- New technology and Federal regulations provide an opportunity to improve the security of the confidential medical information. There is not currently a common source of standards and practices throughout the State to direct the security of automated and manual systems.
- Laboratory test results are a critical part of initiating public health surveillance activities, but there is no electronic system to facilitate exchange of data. The manual exchange of information creates several problems including increased potential for compromised confidentiality of sensitive medical information, no verification of reports being received, no feedback on incomplete information, possible delays in gathering the data and submitting to the LHDs, and significant delays in recognition of a new or increasing disease problem affecting multiple LHDs.
- Providers and laboratories inconsistently report results. The opportunity for double counting of a single case is increased due to the multiple reporting requirements. There is also the potential for underreporting as reporting regulations are often not followed due to the lack of recognition of public health needs, other priorities and lack of resources in provider offices, and the perception that there is little or no penalty for noncompliance.

### **Implementation Strategy**

In order to “bridge the gap” and move toward NEDSS compliant systems and enhance surveillance activities, there are short- and long-term strategies to be considered. These two strategies are not necessarily independent and can be implemented concurrently.

The systems that are associated with surveillance activities in California can be categorized into three groups: (1) systems that are based on limited, older technologies; (2) systems based on promising, current technologies; and (3) systems in development or pilot mode. While not yet in production, systems in the third category are based on current technologies and may prove

useful in the future. By combining systems from the second and third categories, it is possible to develop a NEDSS compliant model for California.

### **Short-Term Compliance Strategy**

The short-term strategy focuses on the enhancement of four of the NEDSS elements as the first steps towards NEDSS compliance. These following elements will provide a foundation for new or existing systems to comply with NEDSS standards.

### **Implement an Integrated Data Repository (IDR)**

The implementation of the IDR is probably the most significant component of enhancing the existing surveillance capabilities to be NEDSS compliant. Since access to information is key to effective surveillance, it is critical that the appropriate organizations have input to the development of an integrated, standardized and trusted source of information. While currently in a pilot phase, the CELDAR system has been designed to integrate data from multiple applications. Although the only source of input is currently from the test MDL application, CELDAR's capabilities can be expanded to become the NEDSS-compliant IDR for surveillance systems.

### **Develop Transportable Business Logic**

The development of the transportable business logic capability will assure that data received from various sources is consistent within the IDR. As specific data elements in the IDR are defined and documented, these business rules may be re-used in other applications. Once the logic is available and implemented in the IDR and external applications, the consistency and reliability of data throughout the surveillance systems will allow for easier integration of data and promote consistent data definitions.

Upon creation of the common business logic, it is critical that a process be established to maintain the IDR and ensure consistent application of business rules between systems.

### **Develop Data Reporting and Visualization Capability**

During the assessment of surveillance systems, it was found that many applications satisfy the reporting and visualization requirements of NEDSS. However, these applications use data specific to a surveillance system and not in an integrated environment.

Since the reports are currently not generated from an integrated source of data, it is essential to develop and test new queries and reports from the emerging IDR. An important aspect of this element development is the possibility for reports to be available to LHDs. This will be critical as Electronic Laboratory Reporting (ELR) solutions are developed and LHDs need access to the information that was previously paper-based. The ability of an LHD to navigate and query the IDR through an easy-to-use interface is crucial to the reengineering of laboratory reporting.

### **Implement a Shareable Directory of Public Health Personnel**

The public health directory will facilitate communication between the State and LHDs, while supporting future security and authentication activities. Currently, the State relies on hardcopy directories or e-mail contact lists to facilitate this communication. One of the surveillance support systems in development, RHEACTS, offers the ability to create a portal-based directory using the Lightweight Directory Access Protocol (LDAP) standard. This directory will be used to support a variety of electronic communications necessary to support public health activities.

including Health Alert Network (HAN), authentication for access to surveillance data and systems, and emergency notifications.

### **Long-Term Strategy**

California needs to consolidate the efforts of multiple stakeholders to see that cost-effective systems are procured and implemented that adhere to NEDSS standards. Accordingly, we propose a long-term strategy to address the need for a synergistic pooling of efforts and resources towards the common objective of systems that are NEDSS compliant and provide for effective surveillance.

We have outlined seven steps for DHS to follow for a successful implementation of the NEDSS criteria:

1. Consolidate power by creating a consensus building, influential organization in support of standardized surveillance systems.
2. Identify key stakeholders and understand their requirements.
3. Based on stakeholder needs, define a strategic vision for business process, systems and organization.
4. Encourage the formation of consortia so that LHDs with similar characteristics can work together to develop common systems.
5. Consider business process re-engineering to optimize and standardize business processes across LHDs and State organizations.
6. Identify and secure financial and human resources.
7. Build and manage systems to this overall vision of a long-term strategy.

### **Next Steps**

With the completion of the assessment and the development of an implementation plan, the State can take specific actions to implement change in the next few months. The following steps will move the State in the direction of efficient, NEDSS compliant surveillance systems.

Develop and submit a proposal to the CDC for funding of the four NEDSS elements discussed above in the short-term implementation strategy.

- Create a detailed work plan for NEDSS element development.
- Identify resources for this development.
- Create the organizational structure to support a centralized authority that is named "NEDSS Office." The NEDSS Office could be an administrative body charged with identifying key stakeholders and funding sources, standardizing surveillance activities, overseeing State compliance with NEDSS criteria, and creating a communications plan.
- Initiate the process to identify key stakeholders.
- Begin documentation of stakeholder requirements.

## B. PROJECT PARTICIPANTS

The DCDC sponsored the Strategic Planning project, and the CalPHIN Strategic Plan Steering Committee and Synergy Consulting, Inc. jointly developed the Plan.

The CalPHIN Strategic Plan Steering Committee provided business-oriented input and perspective to the project. In addition, this Committee participated in working sessions during which the vision, strategic goals, objectives, and strategies for the Plan were developed. The members of the Strategic Plan Steering Committee were as follows:

CalPHIN Strategic Plan Steering Committee	
Participant	Organizational Unit
Dr. Mark Starr	Division of Communicable Disease Control
Dr. Cecil Lynch	STD Control Branch
John Williamson	Information Technology Unit
Ed Eriksson	NEDSS Project Manager
Nancy McQuillen	NEDSS Data Architect
Gwendolyn Doebbert	Center for Health Statistics
Steve Moore	Information Technology Services Division

The CalPHIN (NEDSS) Steering Committee, from which the members of the Strategic Plan Steering Committee were selected, consists of participants from the following programs and offices:

- Bioterrorism Epidemiology Section
- California Cancer Registry
- Center for Health Statistics
- Childhood Lead Poisoning Prevention Branch
- Division of Communicable Disease Control
- Disease Investigations and Surveillance Branch
- Genetic Disease Branch
- Health Information and Strategic Planning
- Immunization Branch
- Information Technology Services Division
- Los Angeles County Department of Health Services
- Microbial Diseases Laboratory
- Office of AIDS
- Office of County Services
- Office of Statewide Health Planning and Development
- Prevention Services
- Refugee Health Section
- San Diego County Health and Human Services Agency
- Sexually Transmitted Disease Control Branch
- Solano County Health Department
- Tuberculosis Control Branch
- Yolo County Health Department

The Synergy Consulting project team, which designed the planning approach and facilitated development of the Plan, consisted of the following individuals:

<b>Synergy Consulting, Inc.</b>	
<b>Team Member</b>	<b>Role</b>
Mark Wilson	Project Leader
Michele Scoggins	Team Member
Karen Glabas	Team Member
Tom Roberson	Technical Advisor

Synergy Consulting, Inc. interviewed the following individuals to capture their input and perspectives regarding the linkage between the Department's business priorities and the use and management of information technology. The ideas, thoughts, and insights expressed during the interviews were essential to the formulation of the Plan's vision, goals, objectives, and strategies. The following individuals were interviewed during the course of the Strategic Plan project:

<b>Interviewees</b>	
<b>Interviewee</b>	<b>Organizational Unit</b>
M.D. Alamgir	California Department of Health Services Refugee Health Section 601 North 7th Street Sacramento, California 95814 malamgir@dhs.ca.gov
Larry Anderson	Client Services Program Manager & Privacy and Security Officer County of Placer Health and Human Services Managed Care Systems 379 Nevada Street Auburn, California 95603 lcanders@placer.ca.gov
Joseph Babineaux	California Department of Health Services Information Technology Services Division Information Security Office 744 P Street, Room 300 Sacramento, California 95814 JBabinea@dhs.ca.gov
Dr. Tom Bates	Epidemiologist California Department of Health Services Division of Communicable Disease Control Tuberculosis Control Branch 2151 Berkeley Way, Room 608 Berkeley, California 94704 tbates@dhs.ca.gov

Interviewees	
Interviewee	Organizational Unit
Elizabeth Baylis	Public Health Microbiologist II California Department of Health Services Division of Communicable Disease Control Viral and Rickettsial Disease Laboratory 850 Marina Bay Parkway Richmond, California, 94804 ebaylis@dhs.ca.gov
Stan Bissell	Chief California Department of Health Services Division of Communicable Disease Control Surveillance and Statistics Section 601 North 7th St., MS 486 Sacramento, California 94234
Mary Brenner	Director, Chief Information Officer Pennsylvania Department of Health Bureau of Information Technology mbenner@state.pa.us
Marchel Burgess	California Department of Health Services Office of HIPAA Compliance 8950 Cal Center Drive Sacramento, California 95826
Dr. Richard Burton	Associate Director California Department of Health Services 714 P Street Sacramento, California 94234 RBurton3@dhs.ca.gov
Terri Carlson	Public Health Manager County of San Bernardino Department of Public Health Program Analysis and Statistics 351 N Mt. View San Bernardino, California 92415 tcarlson@dph.sbcounty.gov
CCLHDM	California Conference for Local Health Data Management Annual Meeting
Helena Chung	Epidemiologist Solano County Health and Social Services hachung@solanocounty.com
Dave Cottam	Medical Records Supervisor California Department of Health Services Division of Communicable Disease Control Viral and Rickettsial Disease Laboratory 850 Marina Bay Parkway Richmond, California, 94804 dcottam@dhs.ca.gov
Randy Curtis	California Department of Health Services Genetic Disease Branch 850 Marina Bay Parkway Richmond, California, 94804 rcurtis@dhs.ca.gov



Interviewees	
Interviewee	Organizational Unit
Kathleen Davidson-Allen	California Cancer Registry Public Health Institute Department of Health Services 1700 Tribute Road, #100 Sacramento, California 95815 KDavids1@dhs.ca.gov
Dan Desmond	CEO The SIMI Group 1610 Arden Way, Suite 280 Sacramento, California 95815 Dan.desmond@simigroup.com
Frank DeBernardi	Chief California Department of Health Services Medical Care Services MIS/DSS Project 1530 12th Street Sacramento, California 95814 fdeberna@dhs.ca.gov
Patricio DiDonato	Director Los Angeles County Department of Health Services Morbidity/Communicable Disease Surveillance Unit 313 N. Figueroa Street, Room 117 Los Angeles, California 90012 pdidonato@dhs.co.la.ca.us
Gwendolyn Doebbert	Assistant Chief for Health Information Policy California Department of Health Services Center for Health Statistics 1800 3rd Street, Room 100 Sacramento, California 94234 gdoebber@dhs.ca.gov
Michael Donahue	Programmer California Department of Health Services Office of AIDS PO Box 942732 Sacramento, California 94234 mdonahue@dhs.ca.gov
Dr. Paul Duffey	Chief California Department of Health Services Microbial Diseases Laboratory Biologics & Immunoserology Section 2151 Berkeley Way, Room 330 Berkeley, California 94704 Pdufey@dhs.ca.gov
EpiForum Members	EpiForum Fall Meeting Participants
Myrna Epstein	Epidemiologist Yolo County Health Department 10 Cottonwood Street Woodland, California 95695 myrna.epstein@yolocounty.org

Interviewees	
Interviewee	Organizational Unit
James Esarte	Data Processing Manager California Department of Finance 915 L Street Sacramento, California 95814 fijesart@dof.ca.gov
Susan Fanelli	California Department of Health Services Office of HIPAA Compliance 8950 Cal Center Drive Sacramento, California 95826
Ed Eriksson	NEDSS Project Manager California Department of Health Services Division of Communicable Disease Control Surveillance and Statistics Section 601 North 7th Street, MS 486 Sacramento, California 94234 eeriksso@dhs.ca.gov
Greg Franklin	Deputy Director California Department of Health Services Health Information & Strategic Planning 1800 3rd Street, Suite 100 Sacramento, California 95814 Gfrankli@dhs.ca.gov
Brandy George	Epidemiologist Shasta County Department of Public Health 2660 Breslauer Way Redding, California 96001 bgeorge@co.shasta.ca.us
Ayesha Gill	California Department of Health Services Division of Communicable Disease Control Immunization Branch 2151 Berkeley Way Berkeley, California 94704 AGill1@dhs.ca.gov
Carol Glaser	Acting Chief California Department of Health Services Division of Communicable Disease Control Viral and Rickettsial Disease Laboratory 850 Marina Bay Parkway Richmond, California, 94804 CGlaser@dhs.ca.gov
Todd Glasser	California Department of Health Services Division of Communicable Disease Control Immunization Branch 2151 Berkeley Way Berkeley, California 94704
Bob Hall	California Department of Health Services Health Information & Strategic Planning Office of County Health Services 1800 3rd Street, Suite 100 Sacramento, California 95814 bhall@dhs.ca.gov

Interviewees	
Interviewee	Organizational Unit
Laura Hardcastle	Chief California Department of Health Services Refugee Health Section 601 North 7th Street Sacramento, California 95814 Lhardcas@dhs.ca.gov
Frederick Harig	California Department of Health Services Childhood Lead Poisoning Prevention Branch 1515 Clay Street, Suite 1801 Oakland, California 94612 FHarig@dhs.ca.gov
Sakchai Himathongkham	California Department of Health Services Refugee Health Section 601 North 7th Street Sacramento, California 95814 shimatho@dhs.ca.gov
Dr. Sandra Huang	Medical Epidemiologist California Department of Health Services Division of Communicable Disease Control 2151 Berkeley Way, Room 708 Berkeley, California 94704 shuang@dhs.ca.gov
Jeffrey Johnson	Epidemiologist II County of San Diego Community Epidemiology Health and Human Services Agency 1700 Pacific Highway San Diego, California 92186 Jeffrey.Johnson@sdcounty.ca.gov
Mike Kassis	Deputy Director, Chief Information Officer Office of Statewide Health Planning and Development Healthcare Information Division 818 K Street, Room 500 Sacramento, California 95814 mkassis@oshpd.state.ca.us
Brett Kelsey	California Department of Health Services Information Technology Services Division Information Security Office 744 P Street, Room 300 Sacramento, California 95814 BKelsey@dhs.ca.gov
Stan Ketchum	Independent Consultant sketchum@dhs.ca.gov
Dawn Kiefler	Administrative Analyst II County of San Diego Health and Human Services Agency Public Health Laboratory 3851 Rosecrans Street San Diego, California 92110 dawn.kiefler@sdcounty.ca.gov

Interviewees	
Interviewee	Organizational Unit
Jerry Knedel	Chief California Department of Health Services Information Technology Services Division Infrastructure Support Branch 744 P Street, Room 1100 Sacramento, California 95814 Jknedel@dhs.ca.gov
Aaron Lorenson	Information Specialist - Epidemiologist County of San Diego Community Epidemiology Health and Human Services Agency 1700 Pacific Highway San Diego, California 92186 Aaron.Lorenson@sdcounty.ca.gov
Dr. Cecil Lynch	Medical Informaticist California Department of Health Services Division of Communicable Disease Control STD Control Branch 601 North 7th St., MS 486 Sacramento, California 94234 clynch@dhs.ca.gov
Chris McLean	Biostatistician County of San Diego Community Epidemiology Health and Human Services Agency 1700 Pacific Highway San Diego, California 92186 Chris.Mclean@sdcounty.ca.gov
Nancy McQuillen	NEDSS Data Architect California Department of Health Services Division of Communicable Disease Control 601 North 7th St., MS 486 Sacramento, California 94234 nmcquill@dhs.ca.gov
Mark Miller	Director Placer County Department of Health and Human Services Communicable Disease Control Public Health Laboratory 11484 B Avenue Auburn, California 95603 mmiller@placer.ca.gov
Steve Moore	California Department of Health Services Information Technology Services Division 601 North 7th St., MS 486 Sacramento, California 94234 smoore@dhs.ca.gov

Interviewees	
Interviewee	Organizational Unit
Tara Naisbitt	California Department of Health Services Office of HIPAA Compliance Administrative Operations Unit 8950 Cal Center Drive Sacramento, California 95826 tnasibit@dhs.ca.gov
Peggy Peterson	Customer Services Health and Human Services Data Center 1651 Alhambra Blvd Sacramento, California 95816 PPeters1@hhsdc.ca.gov
Kimberly Poggmeyer	Senior Epidemiologist County of San Diego Community Epidemiology Health and Human Services Agency 1700 Pacific Highway San Diego, California 92186 Kimberly.poggmeyer@sdcounty.ca.gov
Larry Portigal	California Department of Health Services Health Information and Strategic Planning Center for Health Statistics 304 S Street Sacramento, California 95814 lportiga@dhs.ca.gov
Michael Quinn	Chief California Department of Health Services Health Information and Strategic Planning Office of Health Information & Research 304 S Street Sacramento, California 95814 Mquinn@dhs.ca.gov
Dr. Kevin Reilly	Deputy Director, California Department of Health Services Prevention Services 714 P Street, Room 1492 Sacramento, California 95814 Kreilly@dhs.ca.gov
Mike Rodrian	Chief California Department of Health Services Health Information and Strategic Planning Center for Health Statistics 304 S Street, Sacramento, California 95814 Mrodrian@dhs.ca.gov
Alfonso Rodriguez-Linz	Epidemiologist Office of Binational Border Health 3851 Rosecrans Street San Diego, California 92110

Interviewees	
Interviewee	Organizational Unit
Dr. Michael Samuel	Chief California Department of Health Services STD Control Branch Surveillance and Epidemiology Section 1947 Center Street, Suite 201 Berkeley, California 94704 Msamuel@dhs.ca.gov
Jeff Sanchez	Chief California Department of Health Services Division of Environmental and Occupational Disease Control Health Information System Section 1515 Clay Street, Suite 1801 Oakland, California 94612 Jsanche3@dhs.ca.gov
Scott Schmolke	California Department of Health Services Division of Communicable Disease Control Surveillance and Statistics Section 601 North 7th St., MS 486 Sacramento, California 94234
Jean Slosic	Biostatistician County of San Diego Community Epidemiology Health and Human Services Agency 1700 Pacific Highway San Diego, California 92186 Jean.Slosic@sdcounty.ca.gov
Greg Smith	Chief Information Technology Services Division Information Management Architecture Section 714 P Street, Room 1476 Sacramento, California 95814 Gsmith1@dhs.ca.gov
Greg Smith	WEDSS Director Washington State Department of Health Epidemiology, Health Statistics, and Public Health Laboratories Washington Electronic Disease Surveillance System greg.smith@doh.wa.gov
David Souleles	Chief Deputy Director California Department of Health Services 714 P Street, Room 1253 Sacramento, California 95814 Dsoulele@dhs.ca.gov
Dr. Mark Starr	Acting Chief and NEDSS Program Director California Department of Health Services Division of Communicable Disease Control 601 North 7th St., MS 486 Sacramento, California 94234 mstarr1@dhs.ca.gov



Interviewees	
Interviewee	Organizational Unit
Marc Strassburg	Chief County of Los Angeles Department of Health Services Information Systems Branch Web Informatics Division 313 N Figueroa Street Los Angeles, California 90012 mstrassburg@dhs.co.la.ca.us
Rachael Strider	Chief California Department of Health Services Information Technology Services Division Information Security Office 744 P Street, Room 300 Sacramento, California 95814 rstrider@dhs.ca.gov
Leah Teitler	California Department of Health Services Childhood Lead Poisoning Prevention Branch 1515 Clay Street, Suite 1801 Oakland, California 94612 LTeitler@dhs.ca.gov
Mark Thyer	California Department of Health Services Information Technology Services Division Information Security Office 744 P Street, Room 300 Sacramento, California 95814 MThyer@dhs.ca.gov
Valerie Varzos, CPA	Technology Oversight and Security Unit California Department of Finance 915 L Street Sacramento, California 95814 valerie.varzos@dof.ca.gov
Roberta Ward	Privacy Officer California Department of Health Services 8950 Cal Center Drive Sacramento, California 95826 rward@dhs.ca.gov
Marilyn Wensrich	Chief California Department of Health Services IT Planning and Project Management Branch Information Technology Services Division 744 P Street, Room 1163 Sacramento, California 95814 mwensric@dhs.ca.gov
John Williamson	Chief California Department of Health Services Division of Communicable Disease Control Information Technology Unit 601 North 7th St., MS 486 Sacramento, California 94234 jwilliam@dhs.ca.gov

Interviewees	
Interviewee	Organizational Unit
Craig Wolff	Project Manager California Department of Health Services Environmental Health Investigations Branch 1515 Clay Street, Suite 1700 Oakland, California 94612 CWolff@dhs.ca.gov
Gwen Wynter	Customer Services Health and Human Services Data Center 1651 Alhambra Blvd Sacramento, California 95816 Gwynter@Hhsdc.ca.gov
Alex Zakharenkov	Director of Advanced Technologies and Applications The SIMI Group 1610 Arden Way, Suite 280 Sacramento, California 95815 alexz@simigroup.com

## C. PUBLIC HEALTH ORGANIZATIONS

This appendix describes the public health organizations and their systems that were included in the assessment of the current environment for the Strategic plan.

### Public Health In California

California's public health system is responsible for monitoring and preventing diseases that pose a threat to the State's general population. In addition, the public health system seeks to educate the public on their role in preventing disease and maintaining a healthy population. The Department of Health Services (DHS or Department) administers the public health system in California.

#### Department of Health Services



##### Role in Public Health

The Department of Health Services (DHS) administers California's public health system in cooperation with 61 local health departments (LHD) -- the 58 counties and the cities of Berkeley, Long Beach, and Pasadena. These State and local public health agencies share information about occurrences of specific diseases, and other related data, with the Centers for Disease Control and Prevention (CDC), which tracks such information nationally.

##### Mission

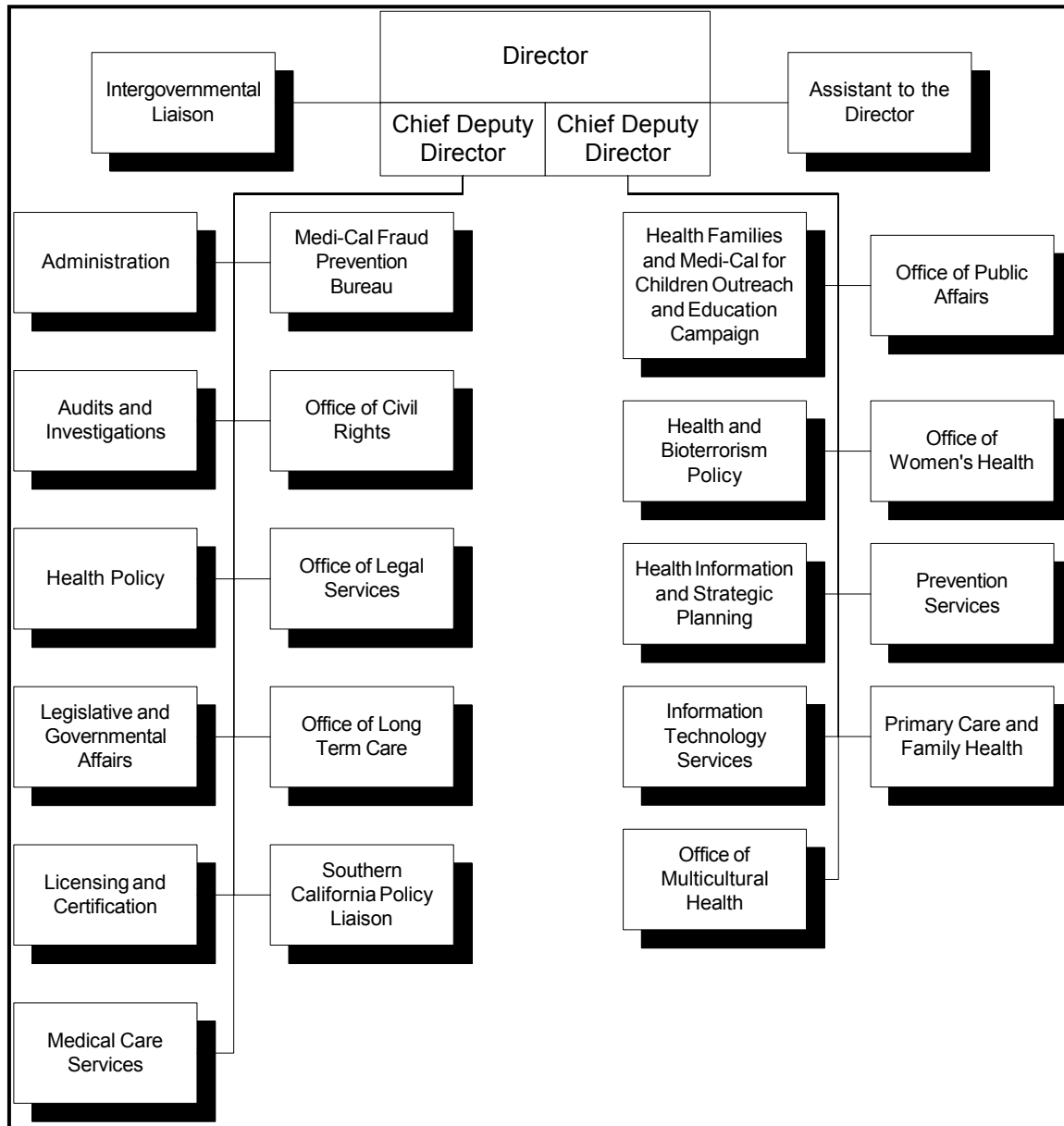
A mission is statement identifies an organization's fundamental purpose and unique reason for existence. The DHS' mission is as follows:

##### Mission

Protect and improve the health of all Californians.

#### Organization

Appointed by the Governor, the DHS Director heads one of the largest departments in State Government, with over 5,000 employees working in the Sacramento headquarters and over 60 field offices throughout the State. The DHS organization is presented in Figure 1 on the following page.



**Figure 1. DHS Organization Chart**

### Technology Structure

To accomplish its mission, the DHS increasingly depends on information technology (IT) systems, applications, databases, and networks. These various IT systems and other components support the State's public health information infrastructure, improve data management, facilitate communications, and enhance the productivity of staff.

The Department's IT infrastructure is extensive, supporting more than 5,000 employees in the Department's programs, offices, and divisions, and approximately 60 other locations throughout the State. The Department's IT infrastructure is dispersed among these locations. In short, the Department's IT infrastructure is complex and diverse, directly or indirectly serving public health in California.

Each of the DHS's divisions, programs, and offices has business program responsibilities as well as IT roles and responsibilities. While the Information Technology Services Division (ITSD) has overall responsibility for enterprise-level IT planning and policy and standards setting; application development, maintenance, and infrastructure support may be provided by the DHS programs and offices.

The following sections describe the business and IT responsibilities and initiatives for public health within the State that were considered in the development of the Strategic Plan.

## Communicable Disease Programs

For the scope of this project, relevant communicable disease programs include:

- Division of Communicable Disease Control
- Infectious Diseases Branch
- Sexually Transmitted Disease Control Branch
- Tuberculosis Control Branch
- Office of AIDS
- Immunization Branch

### Division of Communicable Disease Control

#### Role in Public Health



The DHS, Division of Communicable Disease Control (DCDC) investigates and controls communicable diseases in California. The DCDC works in partnership with local, national, and international health officials, health care providers, and the public to monitor health, identify and investigate existing and potential health problems, develop and implement prevention strategies, conduct research, provide education and training, and formulate and advise on public health policy.

The DCDC provides a key leadership role in California and the nation by evaluating and responding to new and re-emerging infectious disease threats. Each of the branches within the Division, working with local health departments, plays a vital and integral part in the continuing battle to protect California's citizens and visitors from the threats of infectious diseases.

#### Mission

The DCDC's mission is as follows:

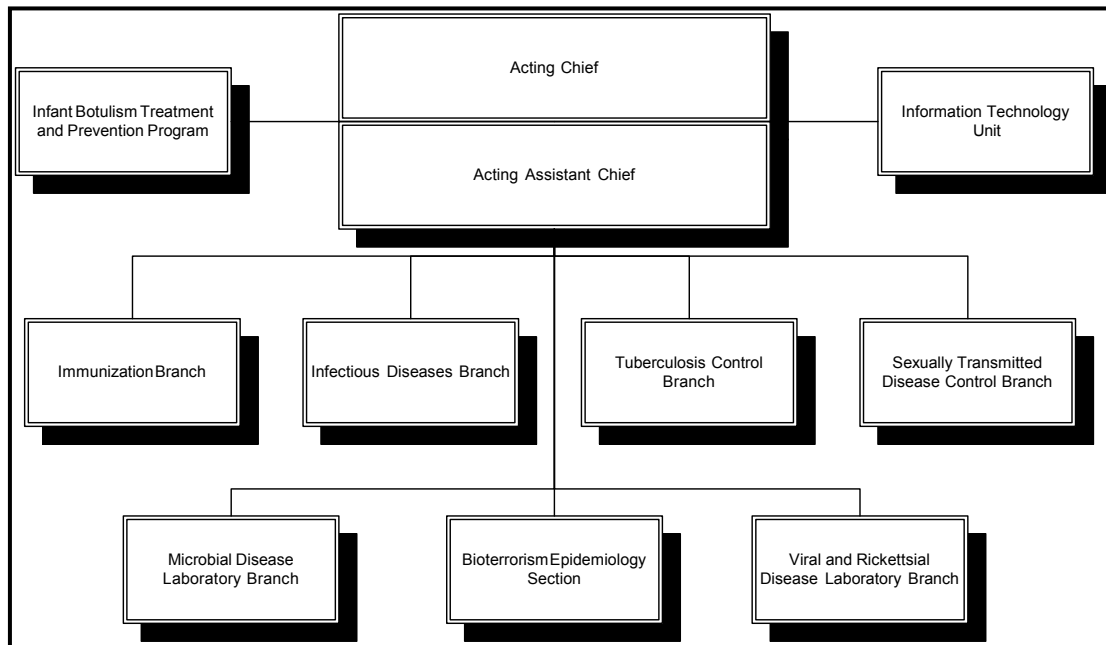
##### Mission

Provide surveillance, investigation, and control of more than 80 communicable diseases and conditions in California.

#### Organization

DCDC is headquartered in Sacramento and is organized into branches that are responsible for specific areas of disease surveillance and control. The Division has over 400 staff members representing 7 categories: Scientific/Laboratory; Administrative/Clerical; Field/Public Health

Advisors; Scientific/Epidemiology Research; Technical/Educational; Medical Professional; and Other. The DCDC organization is depicted in the following organization chart.



**Figure 2. DCDC Organization Chart**

## Technology Structure

In accomplishing its mission, the DCDC increasingly depends on its IT systems, applications, databases, and networks. These various IT systems and other components support the State's communicable disease information infrastructure, improve data management, facilitate communications, and enhance the productivity of staff.

The DCDC's IT infrastructure supports more than 400 employees in the Division's branches and local health departments. The DCDC's IT infrastructure is dispersed among these branches. Each branch has business program responsibilities as well as IT roles and responsibilities. While there is an Information Technology Unit to support the Division, each individual branch has important IT systems and responsibilities.

## Infectious Diseases Branch



### Role in Public Health

The Infectious Diseases Branch (IDB), formerly known as the Disease Investigations and Surveillance Branch, monitors and addresses disease occurrences that impact Californians. The IDB activities cover all diseases not addressed by the Tuberculosis Control, Sexually Transmitted Disease Control, or Immunization Branches, or by the Office of AIDS.

### Surveillance Process

California has a dual reporting system for communicable diseases, with both health care providers and laboratories required to report a case or suspected case of notifiable diseases. California Code of Regulations (CCR), Title 17, §2500, requires health care providers to report over 80 named conditions, as well as any outbreaks of unusual diseases. The providers are



mandated to report directly to the LHD in the jurisdiction where the patient resides. The regulations list the reportable communicable diseases as well as the timeframe for reporting (from one hour up to one week) and the means (by phone, facsimile, mail, email) depending on the disease category. Patient consent is not needed to report cases or suspected cases, or to supply additional information requested by State or local public health officials. To help simplify the reporting process, the State developed a standard form, the Confidential Morbidity Report (CMR), for use by providers.

To support the disease reporting process, local health officers investigate and confirm that the submitted report (CMR) meets the case definitions published by the Centers for Disease Control and Prevention (CDC) for disease reporting. The CDC published a 1990 report, *Case Definitions for Public Health Surveillance*, and subsequent updates to provide updated uniform criteria for health department personnel to use when reporting notifiable diseases.

After confirming a case, the LHDs forward the communicable disease information to the IDB.

### **Mission**

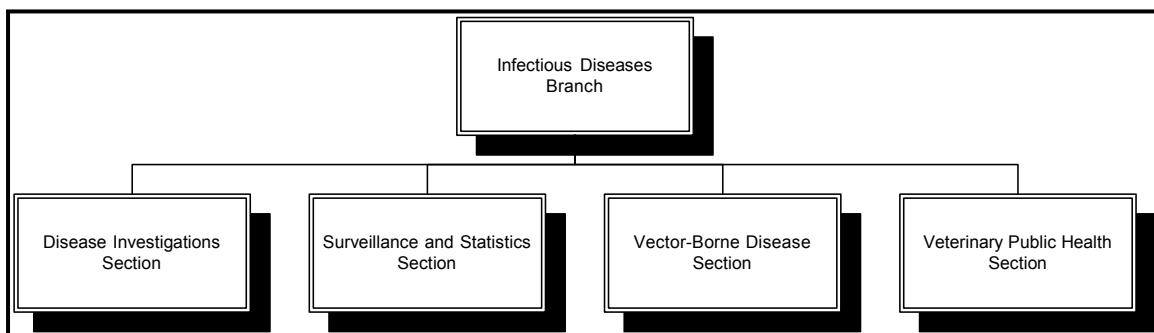
The IDB's mission follows:

#### **Mission**

Protect and promote the health of Californians through the surveillance, investigation, prevention, and control of communicable diseases of public health

### **Organization**

The IDB organization is presented in the following organization chart.



**Figure 3. IDB Organization Chart**

### **Technology Structure**

LHD staff forwards the information collected on the CMR for communicable diseases (other than TB, STD, and AIDS) to the IDB in one of three ways:

- 1) **Using Automated Vital Statistics System (AVSS).** Primarily, LHDs communicate morbidity data to the State using the AVSS. AVSS' primary function is to automate birth and death certificate production. Its secondary function is to collect morbidity-reporting data on the State's reportable communicable diseases. AVSS' CMR data includes the reportable communicable diseases. Local staff manually enters confirmed disease reports into AVSS. On a weekly basis, the State installation of AVSS automatically

connects, via modem, to each of the local AVSS installations to retrieve new morbidity data.

- 2) **Using an electronic bulletin board system (BBS).** There are four LHDs that extract CMR data from internal systems and submit a file to the State via a BBS.
- 3) **Hardcopy disease reports by mail or facsimile.** Low-incidence or low-population LHDs do not use AVSS. These LHDs mail or fax the disease case reports to the IDB staff. The IDB staff manually enters the disease report data into the State instance of AVSS.

Daily, the AVSS communicable disease data is transferred to the CMR component of the MUMPS-based Communicable Disease Management System (CDMS) application. The core of CDMS is identical to AVSS.

The State extracts data from AVSS, CDMS, and the BBS into a database referred to as the "MORB" file. Once in the database, IDB staff applies filtering logic to eliminate duplicates and convert the data into a uniform set of codes. For reporting purposes, IDB staff converts the MORB file data to the CDC National Electronic Telecommunications System for Surveillance (NETSS) format. Summary reports from the MORB file are published on the Internet using MS FrontPage.

Figure 4 illustrates how CMR data flows through surveillance systems and ultimately formatted into the CDC NETSS format.

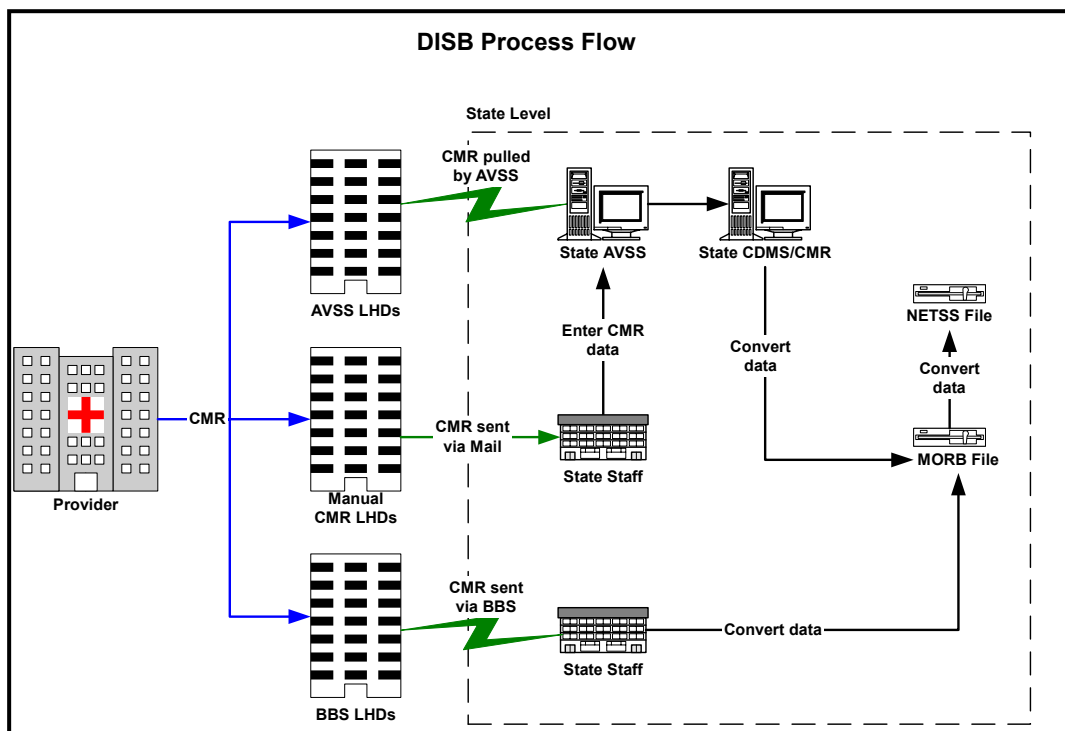


Figure 4. IDB's CMR Process

### NEDSS Assessment

The following table demonstrates AVSS/CDMS' compliance with the eight NEDSS systems elements.

**Figure 5. AVSS/CDMS NEDSS Assessment**

NEDSS Element	AVSS/CDMS Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>None</b>	
1. Multi-tiered web development system using open-platform web servers	None	
2. Browser-based data entry using commercial application server technology	None	
3. JavaScript for field-based data validation in the browser	None	
4. Application servers run shared JAVA code	None	
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>None</b>	
1. Receive, process, and route HL7 messages	None	
2. Store HL7 data	None	
3. Translate and manipulate LOINC and SNOMED codes	None	
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	None	
<b>C. Implement an integrated data repository</b>	<b>None</b>	
1. Store data in common database technology	Full	MUMPS (Cache)
2. Implement PHCDM / HL7 RIM	None	
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	None	
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	None	
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>None</b>	
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	None	
2. Data export/import capability	None	
3. Use XML for bi-directional interchange of data	None	
4. Develop ad hoc exchange interfaces without programming	None	
5. Message infrastructure or broker	None	
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	None	

NEDSS Element	AVSS/CDMS Support	Notes
<b>E. Use contemporary application programming practices</b>	<b>None</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	None	
2. Component development involved EJB, CORBA, or DNA (DCOM)	None	
3. Database access via ODBC and SQL or JDBC connectivity	None	
4. Data repository stored procedures initiate application server functions	None	
<b>F. Develop data reporting and visualization capability</b>	<b>Partial</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	None	
2. Use commercial reporting system	Full	SAS and MS Access
3. Use commercial GIS tool	Full	ArcView
<b>G. Implement a shareable directory of public health personnel</b>	<b>None</b>	
1. Maintain directory using LDAP services	None	
2. Use X.500 standards for field type and length	None	
3. Captures information on roles and expertise of personnel	None	
4. Defined methodologies for directory maintenance and replication	None	
<b>H. Implement a security system and appropriate security policies</b>	<b>None</b>	
1. Documented security procedures for data authentication and transfer	None	
2. Use Internet firewall	None	
3. X.509 certificate-based SSL Server	None	
4. Use an encryption engine	None	
5. Client authentication	None	

## Sexually Transmitted Disease Control Branch



### Role in Public Health

The Sexually Transmitted Disease (STD) Control Branch administers sexually transmitted disease surveillance, investigation, prevention and control activities throughout California. The STD Control Branch assists and collaborates with LHDs, health care providers, non-governmental organizations, and other partners to develop, translate, and disseminate timely, science-based information and policy to develop and support effective clinical and community prevention programs for sexually transmitted diseases in California.

### Surveillance Process

When screening a patient for a sexually transmitted disease, the health care provider sends the patient's specimen to a laboratory for testing. If the patient tests positive for one of the laboratory-reportable STDs as documented in California Code of Regulations (CCR), Title 17, §2505, the laboratory reports the results to the appropriate LHD. The health care provider is also mandated to report suspected or confirmed cases of STD to an LHD.

Patients tested at public health clinics, often co-located with LHDs, have laboratory tests performed at a public health laboratory. The public health laboratory reports both positive and negative results to the LHD.

### Mission

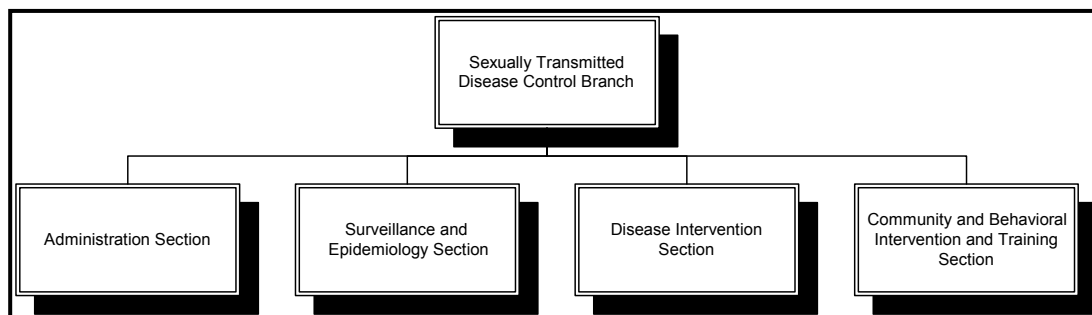
The STD Control Branch's mission follows:

#### Mission

Provide statewide leadership, guidance, training and technical assistance for the prevention and control of STDs, and reduction of their complications and adverse outcomes such as pelvic inflammatory disease, infertility, ectopic pregnancy, neonatal infections, and sexual transmission of HIV.

### Organization

The STD Control Branch organization is depicted in the following organization chart.



**Figure 6. STD Control Branch Organization Chart**

## Technology Structure

LHDs submit data on the reportable STDs to the State in one of four ways:

- 1) **Using AVSS.** Forty LHDs use AVSS to electronically capture and store STD data.
- 2) **Using an electronic bulletin board system (BBS).** Two LHDs, with a high morbidity of STDs, send disease report information within NETSS files. The LHDs submit the files through a dial-up connection to the State's BBS.
- 3) **Hardcopy disease reports by mail or facsimile.** Nine LHDs mail or fax morbidity reports to the STD Control Branch. Control Branch staff enter the data into the STD HQ Computer in Epi Info. Epi Info is a CDC-developed series of Windows and DOS-based programs that assist users in conducting outbreak investigations, database management, surveillance, and statistical analysis. The STD Control Branch uses the DOS version of Epi Info (6.04c).
- 4) **Hardcopy disease reports by mail or facsimile to an Area Office.** Ten LHDs mail or fax STD morbidity reports to one of eight area offices. The information is entered and stored in a local version of Epi Info. Weekly, the areas offices forward this data to the State's HQ Computer through an automatically dialed modem connection.

After receiving and processing the LHD information, the State converts each uniquely coded set of LHD data into a NETSS standard file using SAS (statistical software) scripts. The two LHD NETSS files are appended to the State NETSS file, which is then forwarded to the CDC.

The diagram that follows illustrates how STD data flows through the surveillance systems and ultimately to the CDC.

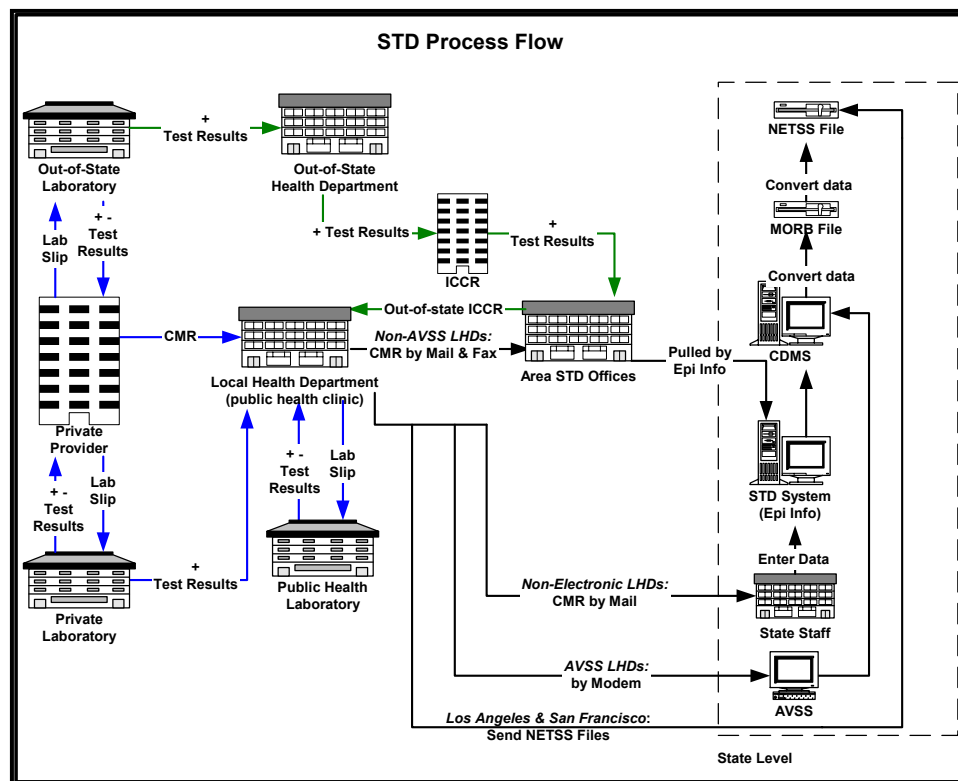


Figure 7. STD CMR Process



## NEDSS Assessment

STD CMRs are processed using components of the IDB infrastructure. As the same systems are used in surveillance of both general communicable diseases and STDs, the IDB NEDSS Assessment section, discussed earlier in this appendix, provides the relevant NEDSS Assessment Matrix for the STD Control Branch.

## Tuberculosis Control Branch



### Role in Public Health

As the lead agency for tuberculosis (TB) prevention and control in California, the TB Control Branch provides leadership at the local, State, and Federal level to control TB in California's diverse communities and institutions. The TB Control Branch has the following six goals:

- Ensure that sufficient resources are available and used effectively to support a public health infrastructure capable of eliminating TB.
- Ensure early identification and reporting of all persons with TB.
- Ensure timely completion of appropriate therapy for all persons with TB.
- Ensure that those in contact with someone with infectious TB are promptly identified, examined, and, if appropriate, treated.
- Reduce the risk of progression to TB in high-risk persons infected with the bacteria that causes TB.
- Reduce the risk of acquiring TB infection in high-risk settings.<sup>3</sup>

### Surveillance Process

Health care providers are mandated to report to LHDs, within one day of diagnosis, all patients with suspected or confirmed cases of TB. Providers use CMRs or locally developed TB CMRs to report suspected cases of TB to the appropriate LHD. Cases of TB identified by laboratories are also reportable to a local health officer under CCR, Title 17, §2505. Laboratory reports to the LHD must be in writing and provide specific information about the patient, provider, and the laboratory test.

### Mission

The TB Control Branch's mission is as follows:

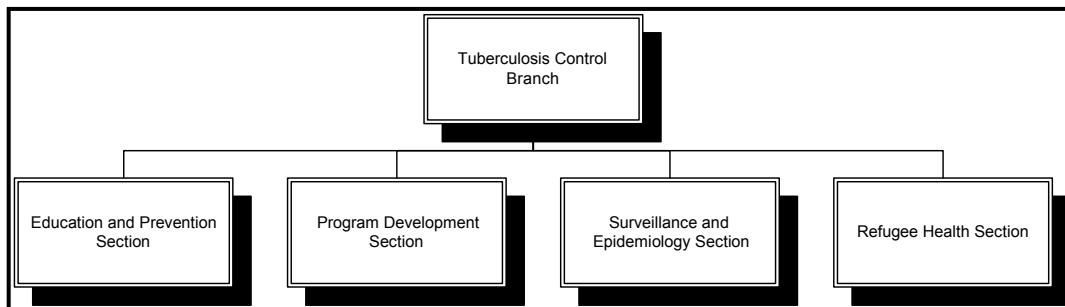
#### Mission

Provide leadership and resources to control and eliminate tuberculosis, and to protect and improve the health of all Californians.

<sup>3</sup> DHS, DCDC. "Communicable Disease Control in California, 2000"

## Organization

The TB Control Branch organization is illustrated in the following organization chart.

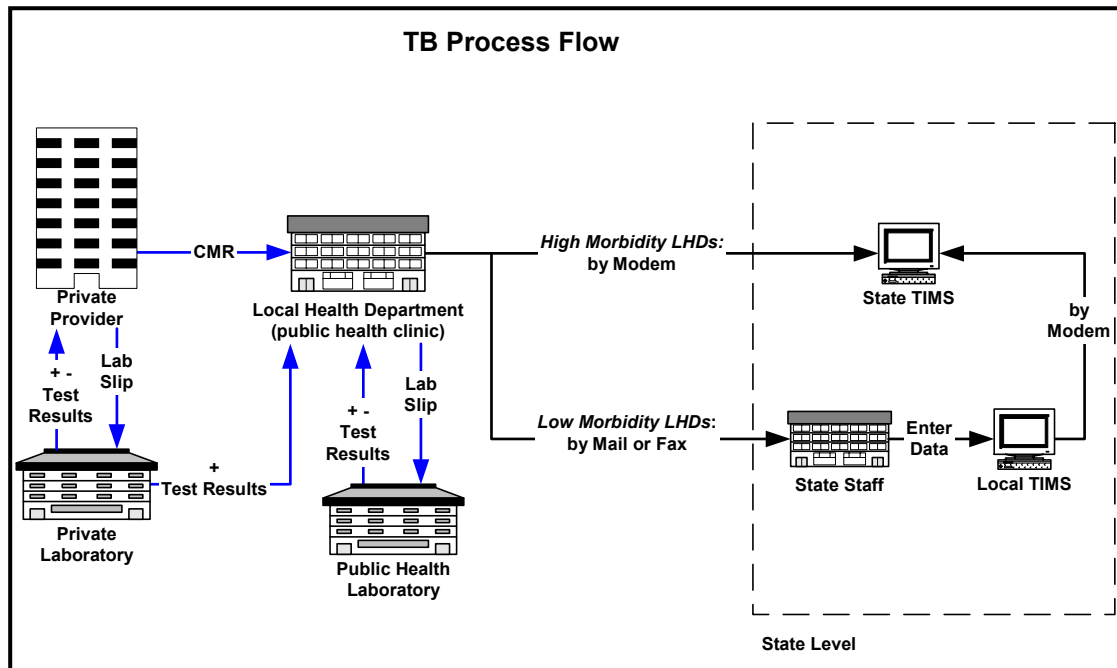


**Figure 8. TB Control Branch Organization Chart**

## Technology Structure

Health care providers and laboratories are mandated to report TB cases to the appropriate LHD within 24 hours of an identified or suspected case. The LHDs subsequently complete a three-part "Report of a Verified Case of TB" (RVCT) form that captures additional case information. Nineteen high-volume LHDS electronically complete the RVCT form using the Tuberculosis Information Management System (TIMS). The TB Control Branch installed the CDC-developed TIMS in the 19 high-morbidity LHDs to capture RVCT information. On a monthly basis, each of these 19 LHDs dials in via modem to the State TIMS computer to upload information regarding new TB cases.

The remaining (low morbidity) LHDS mail or fax hardcopy forms to the TB Control Branch. The TB Control Branch's TB Registry staff then manually enters the data into a local version of TIMS. Every other week, the TB Control Branch's local version of TIMS dials into the State version of TIMS to upload new TB cases. On a monthly basis, the TB Control Branch dials into the CDC's application to transmit California's TB surveillance data. The reporting flow is presented in Figure 9 on the following page.



**Figure 9. TB CMR Process**

The CDC developed the TIMS application using PowerBuilder with an SQL database. TIMS is a Windows-based client/server system that automates the administration of TB prevention, surveillance, and control programs. TIMS has the ability to select and download data from the application database, allow access to information involving clients and treatment activities related to servicing the client, and permit data entry and query operations.

The TB Control Branch also uses SAS to generate a number of summary and ad hoc reports including: quarterly control, quarterly data sets for epidemiology, program analyses, and Tuberculosis Indicator Project (TIP) reports. The TB Control Branch considers the combination of TIMS and SAS to be their surveillance system.

### NEDSS Assessment

The following table demonstrates TIMS's compliance with the eight NEDSS systems elements.

**Figure 10. TIMS NEDSS Assessment**

NEDSS Element	TIMS Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>None</b>	
1. Multi-tiered web development system using open-platform web servers	None	
2. Browser-based data entry using commercial application server technology	None	
3. JavaScript for field-based data validation in the browser	None	
4. Application servers run shared JAVA code	None	
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>None</b>	
1. Receive, process, and route HL7 messages	None	
2. Store HL7 data	None	
3. Translate and manipulate LOINC and SNOMED codes	None	
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	None	
<b>C. Implement an integrated data repository</b>	<b>Partial</b>	
1. Store data in common database technology	Full	SQL
2. Implement PHCDM / HL7 RIM	None	
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	None	
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	None	
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>None</b>	
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	None	
2. Data export/import capability	None	
3. Use XML for bi-directional interchange of data	None	
4. Develop ad hoc exchange interfaces without programming	None	
5. Message infrastructure or broker	None	
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	None	

NEDSS Element	TIMS Support	Notes
<b>E. Use contemporary application programming practices</b>	<b>None</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	None	
2. Component development involved EJB, CORBA, or DNA (DCOM)	None	
3. Database access via ODBC and SQL or JDBC connectivity	None	
4. Data repository stored procedures initiate application server functions	None	
<b>F. Develop data reporting and visualization capability</b>	<b>Partial</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	None	
2. Use commercial reporting system	Full	SAS
3. Use commercial GIS tool	Full	ArcView
<b>G. Implement a shareable directory of public health personnel</b>	<b>None</b>	
1. Maintain directory using LDAP services	None	
2. Use X.500 standards for field type and length	None	
3. Captures information on roles and expertise of personnel	None	
4. Defined methodologies for directory maintenance and replication	None	
<b>H. Implement a security system and appropriate security policies</b>	<b>None</b>	
1. Documented security procedures for data authentication and transfer	None	
2. Use Internet firewall	None	
3. Firewall application software installed	None	
4. X.509 certificate-based SSL Server	None	
5. Use an encryption engine	None	
6. Client authentication	None	

## Refugee Health Section



### Role in Public Health

The Refugee Health Section (RHS) has been building a foundation to fully support incoming refugees in need of medical attention, acculturation, and language interpretation services to improve their quality of life and promote economic self-sufficiency. To address these needs, the RHS has established the following goals:

- Improve the general health status of the refugee populations in California.
- Prevent and control health problems of public health significance among populations.
- Improve general health services for refugees through follow-up of medical conditions identified in the health assessment, health education, and preventive health services, emphasizing those health problems that may impede effective resettlement and hinder economic self-sufficiency.
- Promote and facilitate a better understanding of, and access to California's health care system by improving cultural and linguistic competency of services and eliminating barriers to utilization common to refugee communities.<sup>4</sup>

### Surveillance Process

Prior to arrival in the United States, a refugee receives an overseas medical exam in his/her country for identification of a communicable disease. The results of these exams are captured in the Federal Optional Form (OF) 157. A refugee's health is categorized as Class A, Class B, or healthy. There is also a CDC form, 71.57, which captures entry status (e.g., refugee, immigrant, asylee), alien number, sex, date of birth, and provided address. These two forms are forwarded to one of the eight Department of Quarantine (DQ) offices. If the individual plans to reside in California, the DQ office transfers the refugee's information to a LHD. The LHD then provides the refugee with a comprehensive medical exam.

Fourteen LHDs provide refugees with health assessments. A refugee health assessment is a refugee's first step to health care in the United States. Within 90 days of entering California, all refugees, asylees, parolees, and Cuban/Haitian entrants should have a health assessment. The assessment includes a review of the refugee's overseas medical examination and health history, a physical examination, tests for infections, and necessary immunizations.

The LHDs forward the health assessment information to the State via the Refugee Health Electronic Information System (RHEIS).

### Mission

The RHS's mission follows:

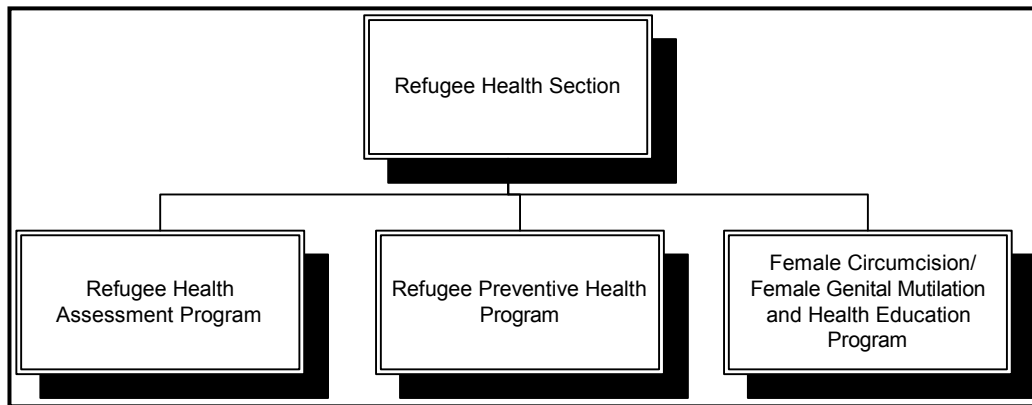
#### Mission

Improve the health status of refugees in California through leadership and oversight of culturally and linguistically competent health care services, and the promotion of a coordinated, seamless system of care through advocacy and policy formulation and recommendation to enable refugees to achieve successful resettlement and self-sufficiency.

<sup>4</sup> DHS, DCDC. "Communicable Disease Control in California, 2000"

## Organization

The RHS' organization is presented in the following organization chart.



**Figure 11. Refugee Health Section Organization Chart**

## Technology Structure

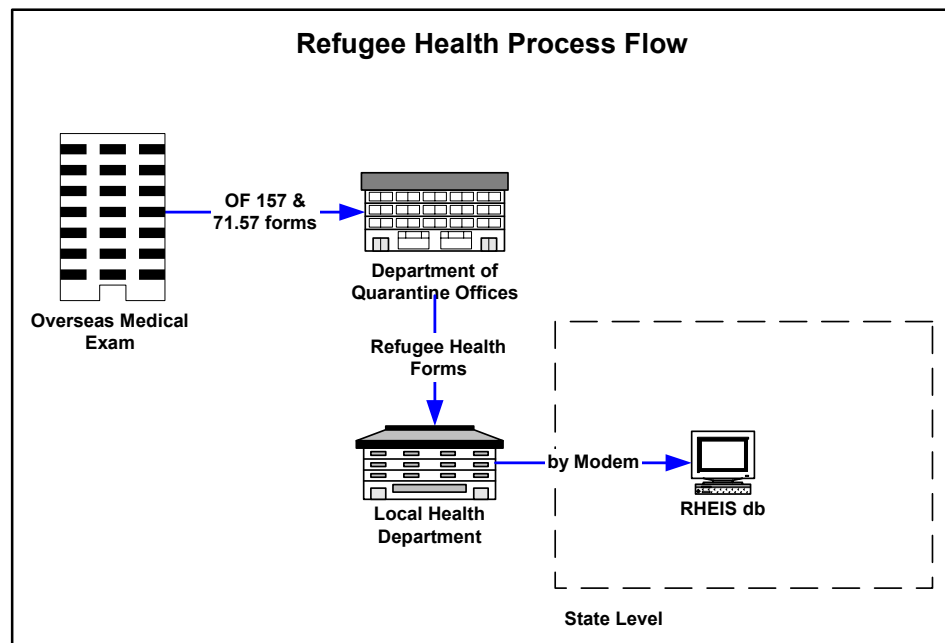
Each of the 14 refugee-processing LHDs enters demographic, medical, diagnostic, emotional, and trauma information into RHEIS using a web browser. RHEIS has limited case management capability, as other DCDC programs outside of the RHS are responsible for performing the long-term case management work for specific diseases. For example, if a patient has TB, Refugee Health will submit case management data to the TBCB for analysis and follow-up.

The LHDs dial into a local Internet Service Provider (ISP) and connect with the RHEIS web server located at the Health and Human Services Data Center (HHSDC). The RHS implemented the first production phase of RHEIS in October 2000. This system was developed internally with advisory consulting assistance from Microsoft Corporation. On a regular basis, Microsoft provided architecture, design, and feedback on completed code. RHEIS uses of a web browser interface, Active Server Pages (ASP), SQL Server, JavaScript for field-base data validation, and a security infrastructure, including the use of a Cisco PIX firewall.

RHS can maintain a common user interface while implementing business logic and data processing changes on the server without impact to LHD resources. The use of a centralized relational database, such as their SQL Server, provides a means of dynamically accepting data entry from all refugee-processing LHDs into one central location. This process reduces processing time, as well as the risk of losing data through multiple data transmission points.

The figure on the following page presents the refugee health surveillance process.





**Figure 12. Refugee Health Section Process**

Most reporting is performed after extracting the latest data set from the SQL Server and importing it into MS Access. There are future plans to perform data-mining activities with SAS. MapInfo is used to visualize data sets, particularly refugee physical locations.

### NEDSS Assessment

The following table demonstrates RHEIS's compliance with the eight NEDSS systems elements.

**Figure 13. RHEIS NEDSS Assessment**

NEDSS Element	RHEIS Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>Full</b>	
1. Multi-tiered web development system using open-platform web servers	Full	
2. Browser-based data entry using commercial application server technology	Full	
3. JavaScript for field-based data validation in the browser	Full	
4. Application servers run shared JAVA code	Full	
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>None</b>	
1. Receive, process, and route HL7 messages	None	
2. Store HL7 data	None	
3. Translate and manipulate LOINC and SNOMED codes	None	
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	None	
<b>C. Implement an integrated data repository</b>	<b>Partial</b>	
1. Store data in common database technology	Full	SQL
2. Implement PHCDM / HL7 RIM	None	
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	Full	
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	None	
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>None</b>	
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	None	
2. Data export/import capability	None	
3. Use XML for bi-directional interchange of data	None	
4. Develop ad hoc exchange interfaces without programming	None	
5. Message infrastructure or broker	None	
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	None	

NEDSS Element	RHEIS Support	Notes
<b>E. Use contemporary application programming practices</b>	<b>Full</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	Full	
2. Component development involved EJB, CORBA, or DNA (DCOM)	Full	COM
3. Database access via ODBC and SQL or JDBC connectivity	Full	
4. Data repository stored procedures initiate application server functions	Full	
<b>F. Develop data reporting and visualization capability</b>	<b>Partial</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	None	
2. Use commercial reporting system	Full	MS Access
3. Use commercial GIS tool	Partial	MapInfo
<b>G. Implement a shareable directory of public health personnel</b>	<b>None</b>	
1. Maintain directory using LDAP services	None	
2. Use X.500 standards for field type and length	None	
3. Captures information on roles and expertise of personnel	None	
4. Defined methodologies for directory maintenance and replication	None	
<b>H. Implement a security system and appropriate security policies</b>	<b>Partial</b>	
1. Documented security procedures for data authentication and transfer	Full	
2. Use Internet firewall	Full	Cisco PIX
3. Firewall application software installed	Full	
4. X.509 certificate-based SSL Server	Full	
5. Use an encryption engine	Full	
6. Client authentication	None	

## Immunization Branch



### Role in Public Health

The Immunization (IZ) Branch provides leadership and support to public and private sector efforts to protect the population against vaccine-preventable diseases. The IZ Branch tracks and monitors immunizations and vaccine-preventable diseases throughout the State.

In 1995, California added to the privately and locally funded efforts by charging the IZ Branch with coordinating and directing immunization registries at the local level. The Immunization Branch works in partnership with health officials, health care providers, and the public to administer state and national immunization efforts.

### Mission

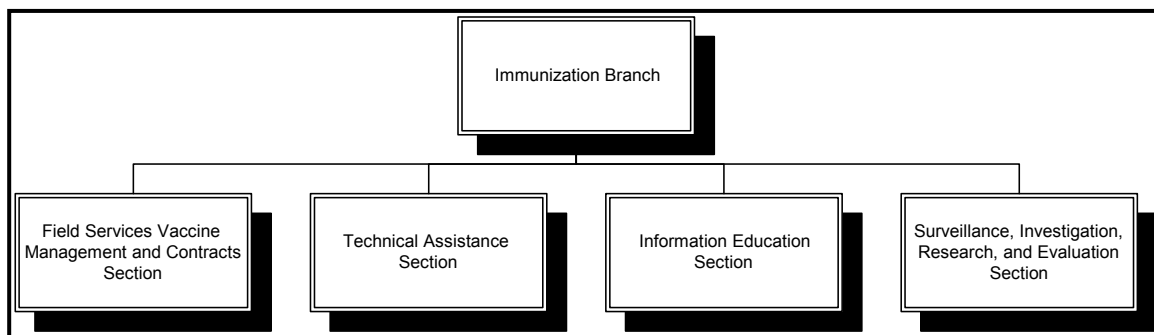
The IZ Branch's mission follows:

#### Mission

Provide leadership and support to public and private sector efforts to **protect California's population** against vaccine-preventable diseases.

### Organization

The IZ Branch organization is depicted in the following organization chart.



**Figure 14. Immunization Branch Organization Chart**

### Technology Structure

For vaccine-preventable disease surveillance, the IZ Branch uses CDMS/VPD<sup>5</sup> to collect and maintain data. The IZ Branch considers their usage of SAS version 8 to be their surveillance system. The manipulation of vaccination data through SAS enables the Branch to complete trend and pattern analysis. The analysis of reported data influences the Branch's policy determination through local schools and provider awareness programs.

California's Immunization registries -- confidential computerized records of the immunizations that a child receives -- provide parents, health care providers, and communities with the information and data to ensure that all children in the State are adequately protected against vaccine-preventable diseases. These important tools also can increase vaccine safety by

<sup>5</sup> Previously discussed in the IDB section of this Appendix.

providing missing or additional information to health care providers and facilitating the monitoring of vaccine adverse events.

The Statewide Immunization Information System (SIIS) is California's statewide immunization registry network. The registry is a computerized system designed to track patient records, reduce missed opportunities, and help providers fully immunize all California kids.

SIIS is a collaborative effort involving local health departments, the IZ Branch, and a spectrum of key stakeholders across the State. SIIS is working to develop an integrated, statewide registry to network each child's full immunization history. This system will ensure that health care providers have rapid access to complete and up-to-date immunization records.

The SIIS will work as follows:

- Providers and health plans use registry software to enter immunization data and send records to the regional registry.
- Other relevant agencies, such as schools, childcare centers, WIC, and CalWORKS may also link into regional registries.
- A state hub will be established to link the regions and unify the system statewide. The regions will send their data to the state hub, where the complete records will be compiled for each child and available to the regions and their providers.
- Large-scale health plans and major sharing partners (such as Medi-Cal) will be able to link directly to the hub.
- In addition, the hub will provide the State with the data to assess immunization coverage rates, identify pockets of need, and analyze how best to ensure full immunization coverage of the State's children.

Some regional registries are already operational. Others will begin implementing their registries over the next year, integrating with existing local registries and bringing in new counties. The State is currently seeking funding to bring counties not yet affiliated with regions into the system. It is estimated that all counties will be participating within the next three to four years. Ongoing efforts will be devoted to promoting and increasing private provider participation in registries.

### **NEDSS Assessment**

Vaccine-preventable CMRs are processed using specific elements of the infrastructure used by the IDB. As the same systems are used in surveillance of both general communicable diseases and vaccine-preventable diseases, the IDB NEDSS Assessment section, discussed earlier in this appendix, provides the relevant NEDSS Assessment Matrix.

### **Office of HIV/AIDS**



#### **Role in Public Health**

To avert the serious personal and public health implications of the HIV disease, the DHS, Office of AIDS positions itself at the forefront of the battle against the HIV/AIDS epidemic. The Office of AIDS's efforts target publicly funded HIV/AIDS care and treatment programs and critical prevention strategies to interrupt HIV transmission.

## Mission

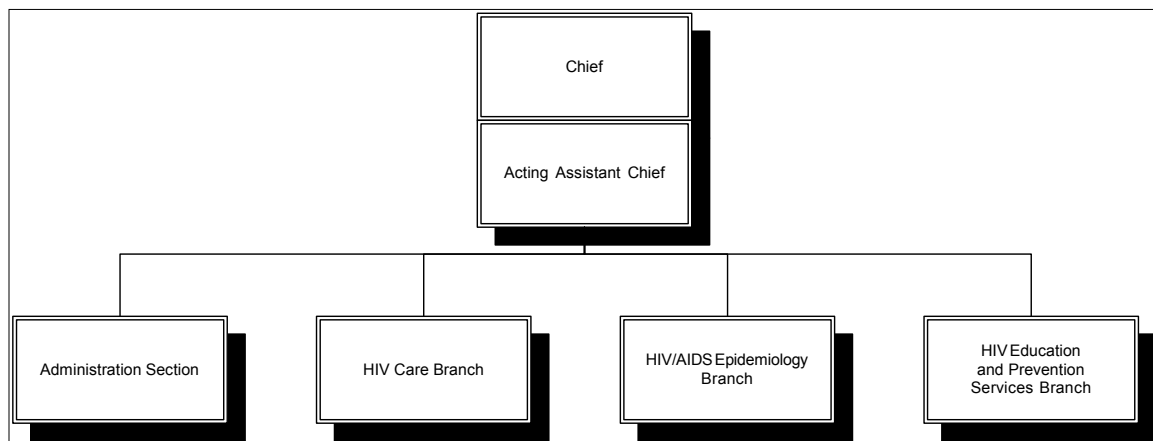
The Office of AIDS's mission is as follows:

### Mission

- 1) Assess, prevent, and interrupt the transmission of HIV and provide for the needs of infected Californians by identifying the scope and extent of HIV infection and the needs which it creates, and disseminating timely and complete information;
- 2) Assure high-quality preventive, early intervention, and care services that are appropriate, accessible, and cost effective;
- 3) Promote the effective use of available resources through research, planning, coordination, and evaluation; and
- 4) Provide leadership through a collaborative process of policy and program development, implementation and evaluation.

## Organization

The Office of AIDS comprises three Branches (HIV/AIDS Epidemiology, HIV Education and Prevention Services, and HIV Care) and the Administration and Clerical Support Sections. The Office of AIDS organization is depicted in the following organization chart.



**Figure 15. Office of AIDS Organization Chart**

## Technology Structure

HIV and AIDS surveillance data are used to allocate resources for patient care, target HIV prevention activities, and evaluate the impact of public health recommendations. The primary statewide (and national) database for HIV and AIDS reporting is the HIV/AIDS Reporting System (HARS) from the CDC. The CDC provided HARS for use by LHDs to report AIDS case information to the California Office of AIDS, and subsequently to the CDC. The goals of HARS are to: monitor trends in HIV and AIDS in the US and determine the scope of severe morbidity due to infection with HIV and its related conditions.

HARS is a collection of DOS-based computer programs and data files developed by the Division of HIV/AIDS at the CDC. HARS simplifies the management and analysis of HIV and AIDS surveillance data. The computer where HARS resides is not connected to a network or the Internet.

The current HARS is outdated for providing information to states regarding the epidemic and must be revamped as soon as possible in order to be of use to states. A new evaluation HARS

(e-HARS) is being piloted in some jurisdictions. If the ongoing e-HARS pilots are successful, the states should soon be allowed to use e-HARS to fulfill the reporting requirements to CDC.



### NEDSS Assessment

The following table demonstrates HARS and e-HARS's compliance with the eight NEDSS systems elements.

**Figure 16. HARS NEDSS Assessment**

NEDSS Element	HARS Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>None</b>	
1. Multi-tiered web development system using open-platform web servers	None	
2. Browser-based data entry using commercial application server technology	None	
3. JavaScript for field-based data validation in the browser	None	
4. Application servers run shared JAVA code	None	
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>Partial</b>	
1. Receive, process, and route HL7 messages	None	
2. Store HL7 data	None	
3. Translate and manipulate LOINC and SNOMED codes	None	
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	Full	
<b>C. Implement an integrated data repository</b>	<b>None</b>	
1. Store data in common database technology	None	
2. Implement PHCDM / HL7 RIM	None	
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	None	
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	None	
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>Partial</b>	
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	Unknown	
2. Data export/import capability	Full	
3. Use XML for bi-directional interchange of data	None	
4. Develop ad hoc exchange interfaces without programming	Partial	Only with SAS, EPI-Info, & text file
5. Message infrastructure or broker	None	
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	None	

NEDSS Element	HARS Support	Notes
<b>E. Use contemporary application programming practices</b>	<b>Partial</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	Full	
2. Component development involved EJB, CORBA, or DNA (DCOM)	Unknown	
3. Database access via ODBC and SQL or JDBC connectivity	None	
4. Data repository stored procedures initiate application server functions	None	
<b>F. Develop data reporting and visualization capability</b>	<b>None</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	None	
2. Use commercial reporting system	None	
3. Use commercial GIS tool	None	
<b>G. Implement a shareable directory of public health personnel</b>	<b>None</b>	
1. Maintain directory using LDAP services	None	
2. Use X.500 standards for field type and length	None	
3. Captures information on roles and expertise of personnel	None	
4. Defined methodologies for directory maintenance and replication	None	
<b>H. Implement a security system and appropriate security policies</b>	<b>Partial</b>	
1. Documented security procedures for data authentication and transfer	Full	
2. Use Internet firewall	None	
3. Firewall application software installed	None	
4. X.509 certificate-based SSL Server	None	
5. Use an encryption engine	Partial	Only on data transfers
6. Client authentication	Partial	Key included with HARS

**Figure 17. e-HARS NEDSS Assessment**

NEDSS Element	e-HARS Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>Full</b>	
1. Multi-tiered web development system using open-platform web servers	Full	
2. Browser-based data entry using commercial application server technology	Full	
3. JavaScript for field-based data validation in the browser	Full	
4. Application servers run shared JAVA code	Full	
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>Partial</b>	
1. Receive, process, and route HL7 messages	Full	
2. Store HL7 data	Partial	Some values are expanded
3. Translate and manipulate LOINC and SNOMED codes	Unknown	
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	Full	
<b>C. Implement an integrated data repository</b>	<b>Partial</b>	
1. Store data in common database technology	Full	
2. Implement PHCDM / HL7 RIM	Partial	
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	Unknown	
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	Full	
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>Partial</b>	
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	Unknown	
2. Data export/import capability	Full	
3. Use XML for bi-directional interchange of data	Unknown	
4. Develop ad hoc exchange interfaces without programming	Full	Canned SAS reports
5. Message infrastructure or broker	Unknown	
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	Unknown	
<b>E. Use contemporary application programming practices</b>	<b>Full</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	Full	
2. Component development involved EJB, CORBA, or DNA (DCOM)	Unknown	

NEDSS Element	e-HARS Support	Notes
3. Database access via ODBC and SQL or JDBC connectivity	Full	
4. Data repository stored procedures initiate application server functions	Full	
<b>F. Develop data reporting and visualization capability</b>	<b>Partial</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	Full	
2. Use commercial reporting system	Partial	Potentially using Crystal Reports
3. Use commercial GIS tool	None	
<b>G. Implement a shareable directory of public health personnel</b>	<b>Partial</b>	
1. Maintain directory using LDAP services	Unknown	
2. Use X.500 standards for field type and length	Full	
3. Captures information on roles and expertise of personnel	Unknown	
4. Defined methodologies for directory maintenance and replication	Full	
<b>H. Implement a security system and appropriate security policies</b>	<b>Partial</b>	
1. Documented security procedures for data authentication and transfer	Full	
2. Use Internet firewall	Full	Not part of software, but required for security
3. Firewall application software installed	Full	Not part of software, but required for security
4. X.509 certificate-based SSL Server	Full	
5. Use an encryption engine	Unknown	
6. Client authentication	Unknown	

## Laboratory Services

### Microbial Diseases Laboratory



#### Role in Public Health

The Microbial Diseases Laboratory (MDL) is the reference microbiology laboratory for all local and county public health laboratories in California, as well as the support laboratory for the CDC for the diagnosis of bacterial, parasitic, and fungal infections. Its highly trained laboratory scientists provide expert consultation, training, and direct state-of-the-art laboratory studies related to the most critical microbial threats to the public's health. Unique services for the detection, definitive identification, and strain differentiation of highly virulent human pathogens are parts of an ongoing surveillance program. This system for early detection of disease clusters and outbreaks that otherwise would go undetected reduces the human and economic costs associated with these diseases.

#### Mission

The MDL's mission follows:

#### Mission

Provide reference, diagnostic and applied research, training, and laboratory oversight activities essential for the detection, identification, epidemiological investigation, control, and prevention of diseases caused by bacteria, fungi, and parasites in humans, foods, water, medical devices, and biologicals in California.

#### Organization

The MDL organization comprises seven laboratories, providing direct and reference laboratory services to public health laboratories in California counties, cities, hospital laboratories, physicians' office laboratories, and island countries of the South Pacific. MDL comprises the following five sections:

- Biologics and Immunoserology Section
- Mycobacteriology and Mycology Section
- Local Laboratory Assistance / Quality Assurance Reporting
- Enteric Diseases and Special Pathogens Section
- Environmental Microbial Section

#### Technology Structure

MDL specimen submitters have the following three choices in which to electronically submit data to the MDL:

- Use a web form
- Submit a single ASCII file
- Submit batch data in ASCII or HL7 file format.

The data is initially put into a "holding" database. After the MDL staff views the data and assigns an accession number, the data is then stored in the MDL database.

There are two MDL systems in place for the above process: an intranet version, MDL Phase I, and an extranet version, MDL Phase II.

The MDL Phase I system was developed in a collaborative effort between IBM and the DHS's Information Technology Services Division (ITSD). MDL Phase I is a 3-tiered browser-based system built using common data element standards. The system performs server-side validation, and in the future will also perform client-side validation. The MDL Phase I system comprises a DB/2 database residing on an IBM S/390 mainframe at the Health and Human Services Data Center. The web server accesses DB/2 through an interface consisting of COBOL programs with embedded CICS calls.

MDL Phase II, extranet specimen submission system, was built to comply with most of the NEDSS elements. It utilizes SNOMED and LOINC coding, an LDAP-based public health directory, a NEDSS compliant security structure, server level certificates, a data broker shared with the CELDAR system, and supports HL7 messages.

### NEDSS Assessment

The following table demonstrates MDL's compliance with the eight NEDSS systems elements.

**Figure 18. MDL Phase I NEDSS Assessment**

NEDSS Element	MDL II Phase I Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>Partial</b>	
1. Multi-tiered web development system using open-platform web servers	Full	
2. Browser-based data entry using commercial application server technology	Partial	Intranet only
3. JavaScript for field-based data validation in the browser	None	Data validated on application server, not in browser
4. Application servers run shared JAVA code	None	
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>Partial</b>	
1. Receive, process, and route HL7 messages	Full	Translates MDL data to HL7 messages and sends ORU messages. MDL only accepts and stores ACK messages, it doesn't validate them.
2. Store HL7 data	None	
3. Translate and manipulate LOINC and SNOMED codes	None	Limited to a few modules.
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	None	
<b>C. Implement an integrated data repository</b>	<b>None</b>	
1. Store data in common database technology	Full	DB2
2. Implement PHCDM / HL7 RIM	None	
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	None	
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	None	
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>None</b>	
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	None	
2. Data export/import capability	None	
3. Use XML for bi-directional interchange of data	None	



NEDSS Element	MDL II Phase I Support	Notes
4. Develop ad hoc exchange interfaces without programming	None	
5. Message infrastructure or broker	None	
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	None	
<b>E. Use contemporary application programming practices</b>	<b>Partial</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	None	
2. Component development involved EJB, CORBA, or DNA (DCOM)	None	
3. Database access via ODBC and SQL or JDBC connectivity	None	
4. Data repository stored procedures initiate application server functions	Full	
<b>F. Develop data reporting and visualization capability</b>	<b>Partial</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	None	
2. Use commercial reporting system	Full	QMF for Windows; MS Access
3. Use commercial GIS tool	None	
<b>G. Implement a shareable directory of public health personnel</b>	<b>None</b>	
1. Maintain directory using LDAP services	None	
2. Use X.500 standards for field type and length	None	
3. Captures information on roles and expertise of personnel	None	
4. Defined methodologies for directory maintenance and replication	None	
<b>H. Implement a security system and appropriate security policies</b>	<b>None</b>	
1. Documented security procedures for data authentication and transfer	None	
2. Use Internet firewall	None	
3. Firewall application software installed	None	
4. X.509 certificate-based SSL Server	None	
5. Use an encryption engine	None	
6. Client authentication	None	

**Figure 19. MDL Phase II NEDSS Assessment**

NEDSS Element	MDL II Phase II Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>Full</b>	
1. Multi-tiered web development system using open-platform web servers	Full	
2. Browser-based data entry using commercial application server technology	Full	
3. JavaScript for field-based data validation in the browser	Partial	Data validated on application server, and in browser.
4. Application servers run shared JAVA code	None	ASP/COM/SQL (DNA).
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>Partial</b>	
1. Receive, process, and route HL7 messages	Partial	Receives and sends HL7 formatted files, not messages. Translates MDL data to HL7 messages; and sends ORU message to CELDAR. Accepts and stores ACK messages, but does not validate them.
2. Store HL7 data	Partial	Stores parsed data. Stores log of message transmissions and records per transmission.
3. Translate and manipulate LOINC and SNOMED codes	Partial	Basic mapping for incoming data and outgoing reports to CELDAR.
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	Partial	Lab data only. No case validation.
<b>C. Implement an integrated data repository</b>	<b>Partial</b>	
1. Store data in common database technology	Full	SQL Server, PHLM.
2. Implement PHCDM / HL7 RIM	Partial	For main tables.
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	Partial	Within SQL2000 (for external piece) and SQL7 (for internal) capabilities.
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	Partial	Supported, but not allowed around COM objects.
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>Partial</b>	
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	Partial	DNA
2. Data export/import capability	Full	

NEDSS Element	MDL II Phase II Support	Notes
3. Use XML for bi-directional interchange of data	Partial	
4. Develop ad hoc exchange interfaces without programming	None	
5. Message infrastructure or broker	None	
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	Partial	
<b>E. Use contemporary application programming practices</b>	<b>Partial</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	Partial	System does not do case management
2. Component development involved EJB, CORBA, or DNA (DCOM)	Full	DNA
3. Database access via ODBC and SQL or JDBC connectivity	Full	ADO
4. Data repository stored procedures initiate application server functions	None	
<b>F. Develop data reporting and visualization capability</b>	<b>Full</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	Full	Is not integrated with any particular one, but fully capable.
2. Use commercial reporting system	Full	
3. Use commercial GIS tool	Full	
<b>G. Implement a shareable directory of public health personnel</b>	<b>Partial</b>	
1. Maintain directory using LDAP services	Partial	Not used for management, but supports it
2. Use X.500 standards for field type and length	Full	
3. Captures information on roles and expertise of personnel	Full	
4. Defined methodologies for directory maintenance and replication	None	
<b>H. Implement a security system and appropriate security policies</b>	<b>Partial</b>	
1. Documented security procedures for data authentication and transfer	Full	
2. Use Internet firewall	Full	
3. Firewall application software installed	Full	
4. X.509 certificate-based SSL Server	Full	
5. Use an encryption engine	Full	
6. Client authentication	None	

## **California Electronic Laboratory Disease Alert and Reporting System**

### **Role in Public Health**

The reporting of laboratory results for notifiable diseases is critical for the detection of disease threats and bioterrorism responsiveness expected from local, State and Federal public health officials. Most disease reports received by local health departments originate from clinical laboratories. Due to the conventional method of reporting via mail, facsimile, or telephone requires active participation of laboratory staff; automated reporting from clinical laboratories was proposed as a means to improve the quality and timeliness of disease notification.

In the Fall of 1999, DCDC initiated a proof of concept project to demonstrate the capability of collecting laboratory reports electronically and storing the data in a consolidated reporting environment. The database would be used to automatically generate disease alerts based upon business rules established for specific diseases. The California Electronic Laboratory Disease Alert and Reporting (CELDAR) system was successfully demonstrated through a joint effort of the DCCD, ITSD, and IBM. The demonstration project consisted of receiving laboratory transactions from the State's Microbial Disease Laboratory (MDL) test system, collecting the laboratory information in a common database, and generating an alert (e.g., pager, mobile phone, or e-mail) for specific diseases.

After demonstrating the data collection, storage, and alert capability in a test environment, the DHS expanded the concepts from that project to pilot a production system. The pilot is currently underway and focuses on laboratory test results mandated by regulation, including specified diseases of a bioterrorist concern.

### **Technology Structure**

CELDAR laboratory report submitters have the following three choices in which to electronically submit data to the CELDAR system:

- Use a web form
- Submit a single ASCII file
- Submit batch data in ASCII or HL7 file format.

The CELDAR system was built to comply with most of the NEDSS elements and other CDC requirements and specifications. It utilizes SNOMED and LOINC coding, an LDAP-based public health directory, a NEDSS compliant security structure, server level certificates, a data broker shared with the MDL system, and supports HL7 messages.

### NEDSS Assessment

The following table demonstrates CELDAR's compliance with the eight NEDSS systems elements.

**Figure 20. CELDAR NEDSS Assessment**

NEDSS Element	CELDAR Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>Full</b>	
1. Multi-tiered web development system using open-platform web servers	Full	
2. Browser-based data entry using commercial application server technology	Full	
3. JavaScript for field-based data validation in the browser	Full	Implemented for client-side validation.
4. Application servers run shared JAVA code	Full	Application servers can run JAVA code, but JAVA was not used to develop the application logic.
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>Partial</b>	
1. Receive, process, and route HL7 messages	Full	HL7 2.1, 2.2, 2.3, 2.3.1, 3.0 and custom combinations specific to each participant are supported.
2. Store HL7 data	Full	Data is stored in NEDSS Logical Data Model format, which is CDC-stated to be HL7 compatible.
3. Translate and manipulate LOINC and SNOMED codes	Full	LOINC, SNOMED, and other coding systems are supported.
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	Partial	
<b>C. Implement an integrated data repository</b>	<b>Full</b>	
1. Store data in common database technology	Full	Uses MS SQL 2000.
2. Implement PHCDM / HL7 RIM	Full	NEDSS Logical Data Model is used with additions to accommodate for HAN functionality.
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	Full	DCOM
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	Full	Supports ODBC, ANSI SQL, JDBC, and SQLXML
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>Full</b>	

NEDSS Element	CELДАР Support	Notes
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	Full	DCOM
2. Data export/import capability	Full	
3. Use XML for bi-directional interchange of data	Full	Two-way communication is possible, but not required yet. Currently CELДАР is only receiving data.
4. Develop ad hoc exchange interfaces without programming	Full	
5. Message infrastructure or broker	Full	MS Biztalk
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	Full	
<b>E. Use contemporary application programming practices</b>	<b>Partial</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	Partial	System does not do case management.
2. Component development involved EJB, CORBA, or DNA (DCOM)	Full	DCOM
3. Database access via ODBC and SQL or JDBC connectivity	Full	
4. Data repository stored procedures initiate application server functions	None	
<b>F. Develop data reporting and visualization capability</b>	<b>Partial</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	Full	Commercial reporting systems have been tested with the system using ODBC access.
2. Use commercial reporting system	None	Outside scope of pilot.
3. Use commercial GIS tool	None	Outside scope of pilot.
<b>G. Implement a shareable directory of public health personnel</b>	<b>Partial</b>	
1. Maintain directory using LDAP services	Partial	Support role and basic contact lookup using standard attributes.
2. Use X.500 standards for field type and length	Full	
3. Captures information on roles and expertise of personnel	Full	
4. Defined methodologies for directory maintenance and replication	None	Outside scope of CELДАР.
<b>H. Implement a security system and appropriate security policies</b>	<b>Partial</b>	
1. Documented security procedures for data authentication and transfer	Full	



NEDSS Element	CELDAR Support	Notes
2. Use Internet firewall	Full	CISCO PIX Firewalls and MS ISA Server are used for network protection.
3. X.509 certificate-based SSL Server	Partial	Tested, outside scope of pilot.
4. Use an encryption engine	Full	Server-side SSL is used for encryption of the data and authentication purposes.
5. Client authentication	None	Username and password system is used.



## **Viral and Rickettsial Disease Laboratory**

### **Role in Public Health**

The Viral and Rickettsial Disease Laboratory (VRDL) provides laboratory support, technical assistance, and research required for the diagnosis, investigation, and control of viral diseases and for the development and maintenance of high quality local viral laboratory services in California. VRDL also provides consultation services to local public health laboratory staff, the State Department of Health Services, and other state agencies. For counties without public health laboratory services, VRDL functions as the reference and local public health laboratory in its field of expertise. As part of the Department's laboratory science training program, VRDL trains local public health laboratory personnel in state-of-the-art standardized laboratory procedures.

### **Mission**

The VRDL's mission follows:

#### **Mission**

Promote and protect the public health of Californians by providing state-of-the-art diagnostic, reference laboratory leadership, applied research, and training services in the field of viral and rickettsial diseases

### **Organization**

The VRDL comprises the following five sections:

- Viral Immunoserology Section
- Viral Isolation Section
- Epidemiology Support Section
- Retrovirus Diagnostic Section
- Respiratory Disease/AIDS Support Section

### **Technology Structure**

VRDL was one of the first computerized laboratories in the State. VRDL's Laboratory Information System (LIS), a mainframe system developed in COBOL, was initially developed in 1970 and last updated in 1984.

Annually, VRDL receives approximately 5,000 retrovirus, 3,500 diagnostic, and 3,500 special projects disease specimens. Limited clinical information for the 3,500 diagnostic specimens is captured in the VRDL's LIS.

Daily, VRDL staff enters data into a Fortran system. The Fortran file is sent to ITSD staff in Sacramento. Weekly, ITSD staff update the mainframe VRDL LIS with the information from the Fortran files.

For the Title 17 diseases, the VRDL sends hard copy reports to the DCDC and LHDs.

## Local Public Health

### Local Health Departments (LHD)

#### Role in Public Health

The National Association of County and City Health Officials uses the following definition for a local public health agency: “An administrative or service unit of local or state government, concerned with health, and carrying some responsibility for the health of a jurisdiction smaller than the state.”<sup>6</sup> The relationship between the state-level agencies and the 61 LHDs plays an important role in defining an LHD’s responsibilities and authorities.

California is a decentralized system, with responsibility residing at the local level. In California, the LHDs hold the ultimate responsibility of caring for, monitoring, and educating their local citizens regarding communicable diseases. Health services are administered locally in order to address the unique needs of a given community. In addition, California’s LHDs provide surveillance and epidemiology services to their individual jurisdictions.

#### Process

Local capacities to address public health issues vary widely, and often within the same LHD, depending on the disease. Regardless of the resources and personnel, all disease interventions take place at the local level.

California’s LHDs are extraordinarily diverse in size, structure, and function. The evolution of LHD presence, size, and role has depended on a multitude of historical and political factors. The nature of the relationships between the State and the LHDs varies widely as well.

#### Technology Structure

LHD sophistication and technological capabilities are varied. A few LHDs have created sophisticated surveillance information systems. By contrast, the majority of LHDs use manual, paper-based processes. In addition, a few LHDs have dedicated IT staff. These staff are often knowledgeable of current technology and aware of industry standards for coding and message formats. The majority of LHDs typically do not have dedicated IT staff. Their technology resources are severely limited, as they must be shared with other departments in the County.

## Other Public Health Organizations

### Bioterrorism Surveillance and Epidemiology Team



#### Role in Public Health

The Bioterrorism (BT) team is part of a multidisciplinary DHS initiative to strengthen public health infrastructure to detect, identify, investigate, and control illnesses due to biological or chemical terrorist attacks.

#### Process

The BT team focuses on enhancing State and local health surveillance and epidemiologic response capacity for diseases due to biological agents such as anthrax, botulism, brucellosis,

<sup>6</sup> NACCHO, “The role of Local Public Agencies and the Health Alert Network Program in a National Surveillance System.” April 2000

smallpox, tularemia, and viral hemorrhagic fever. If a suspected bioterrorism event occurs, the BT team will also provide epidemiologic assistance and coordination to the LHDs.

### **Technology Structure**

Currently, the BT team does not use a specific information system. They do use data from other systems and public health programs to conduct statistical analysis (primarily using SAS).

## **California Cancer Registry**



### **Role in Public Health:**

The California Cancer Registry (CCR) is California's statewide population-based cancer surveillance system. The CCR collects information about all cancers diagnosed in California (except basal and squamous cell carcinoma of the skin and carcinoma in situ of the cervix). This information furthers the CCR's understanding of cancer and is used to develop strategies and policies for its prevention, treatment, and control.

The availability of data on cancer in the State allows health researchers to analyze geographic, ethnic, occupational and other differences to provide clues that point to risk factors. Due to the size and diversity of the California population, more is now known about the occurrence of cancer in diverse populations than ever before. The CCR has proven to be the cornerstone of a substantial amount of cancer research in the California population.

Today, the CCR is a collaborative effort involving the DHS, ten regional registries, hospitals, cancer researchers throughout the nation, and the Public Health Institute. To date, the CCR has collected detailed information on over 1.3 million cases of cancer, with over 121,000 new cases added annually. The database includes information on demographics, cancer type, extent of disease at diagnosis, treatment, and survival. With this high quality data, leading cancer researchers are able to advance scientific knowledge about the causes, treatment, cures and prevention of cancer.

### **Process**

Hospitals are required to electronically report cancer case information in a specific format to the regional cancer registries. California has 10 regions and 8 regional cancer registries. The CCR provides password-protected software for hospitals to use in reporting the information. The hospitals create files and send to the appropriate regional registries.

In addition, physicians are required to report to a regional registry if the patient is not going to be seen by another reporting entity (such as a hospital). This occurs if the patient is diagnosed and treated in the physician's office (e.g., skin cancer). There is a standardized form (created by the CCR) for physicians to use to report cancer cases.

The regional cancer registries process cancer case reports from all hospitals, radiation oncology centers, and physicians in their region. All reported cases are subjected to a rigorous quality control process. Regional technical staff provide training and consultation to cancer registrars working in reporting facilities.

### **Technology Structure**

The CCR has recently completed user acceptance testing and training on EUREKA, the CCR's first truly comprehensive statewide database. The CCR is in the process of migrating data from

the older systems to EUREKA. The CCR plans to run the current systems and EUREKA in parallel to ensure the accuracy and integrity of the new system and data.

In addition, the CCR is developing ePath, an electronic pathology laboratory reporting system.

## California Lead Poisoning Prevention Branch



### Role in Public Health

The Childhood Lead Poisoning Prevention Act established the Childhood Lead Poisoning Prevention Branch (CLPPB) within the DHS. The Act requires the CLPPB to compile information, identify target areas, and analyze information to design and implement a program of medical follow-up and environmental abatement to reduce childhood lead exposure.

The CLPPB has the following six goals.

- An informed public able to protect children from lead exposures
- Well-supported, effective local programs to detect, manage and prevent childhood lead poisoning
- Fully developed capacity to track lead exposure statewide and to monitor the management of lead burdened children
- Strong infrastructure and preventing children's exposure to lead through partnerships with government agencies, community-based organizations, and the private sector
- Full compliance with Federal and State statutory and regulatory requirements
- Continued State and national leadership through research, policy development and standard setting

### Process

Physicians ask specific questions to determine if there is a risk for exposure to lead (such income level, ethnicity, age of housing). If there is a risk, the physician takes a blood sample from the child. The blood sample is sent to a qualified laboratory. The laboratory then reports the test results to the State.

The CLPPB in turn forwards case notification letters to the appropriate LHD. Some laboratories also report directly to LHDs. The CLPPB provides oversight functions and provides funding to the LHDs to provide case management.

### Technology Structure

The State enters the necessary lead surveillance data into the Response and Surveillance System for Childhood Lead Exposures (RASSCLE) to create a statewide database. The LHDs also have RASSCLE databases. However, these local databases are not linked to the each other or to the State's database.

RASSCLE II will replace the CLPPB's current legacy system. RASSCLE II is a case management and surveillance system that is planned to be NEDSS-compatible. RASSCLE II is a multi-tiered centralized database accessible via the Web. The CLPPB used the NEDSS standard HL7 RIM and PHCDM to create their data model.



The data model includes the lead requirements previously missing from the other models. The CLPPB is preparing to release a Request for Proposals (RFP) to obtain a vendor to develop the system.

### NEDSS Assessment

The following table demonstrates the plans for RASSCLE II's compliance with the eight NEDSS systems elements.

**Figure 21. RASSCLE II NEDSS Assessment**

NEDSS Element	RASSCLE II Support	Notes
<b>A. Conduct and support web browser-based data entry and data management</b>	<b>Unknown</b>	
1. Multi-tiered web development system using open-platform web servers	Full	
2. Browser-based data entry using commercial application server technology	Unknown	
3. JavaScript for field-based data validation in the browser	Unknown	
4. Application servers run shared JAVA code	Unknown	
<b>B. Accept, route, and process electronic HL7 messages</b>	<b>Full</b>	
1. Receive, process, and route HL7 messages	Full	
2. Store HL7 data	Full	
3. Translate and manipulate LOINC and SNOMED codes	Unknown	
4. Use application logic for validating data, queuing data reports, and initiating completion of case reports	Full	
<b>C. Implement an integrated data repository</b>	<b>Full</b>	
1. Store data in common database technology	Full	
2. Implement PHCDM / HL7 RIM	Full	
3. House stored procedures that can initiate EJB, CORBA, and DNA (DCOM) objects	Unknown	
4. Support ODBC, ANSI standard SQL, and JDBC access for data input	Full	
<b>D. Develop active data translation and exchange (integration broker) functionality</b>	<b>Full</b>	
1. Use application logic for validating data, queuing data reports, or initiating the full message submission with EJB, CORBA, or DNA (DCOM) components	Unknown	
2. Data export/import capability	Full	
3. Use XML for bi-directional interchange of data	Full	
4. Develop ad hoc exchange interfaces without programming	Full	
5. Message infrastructure or broker	Full	
6. XML messages and application logic for reporting derived from PHCDM / HL7 RIM	Full	

NEDSS Element	RASSCLE II Support	Notes
<b>E. Use contemporary application programming practices</b>	<b>Unknown</b>	
1. Documented business rules for data accumulation, validation, processing, workflow implementation, data coding, registry mapping, and case management	Full	
2. Component development involved EJB, CORBA, or DNA (DCOM)	Unknown	
3. Database access via ODBC and SQL or JDBC connectivity	Unknown	
4. Data repository stored procedures initiate application server functions	Full	
<b>F. Develop data reporting and visualization capability</b>	<b>Partial</b>	
1. Integrate commercial reporting systems using ODBC and JDBC data access	Full	
2. Use commercial reporting system	Unknown	
3. Use commercial GIS tool	Partial	
<b>G. Implement a shareable directory of public health personnel</b>	<b>Partial</b>	
1. Maintain directory using LDAP services	Partial	
2. Use X.500 standards for field type and length	Partial	
3. Captures information on roles and expertise of personnel	Full	
4. Defined methodologies for directory maintenance and replication	Full	
<b>H. Implement a security system and appropriate security policies</b>	<b>Full</b>	
1. Documented security procedures for data authentication and transfer	Full	
2. Use Internet firewall	Full	
3. Firewall application software installed	Full	
4. X.509 certificate-based SSL Server	Full	
5. Use an encryption engine	Full	
6. Client authentication	Full	

## Environmental Health Investigations Branch



### Role in Public Health

The mission of the Environmental Health Investigations Branch (EHIB) is to identify and work toward controlling harmful environmental factors, and promote those that are healthful. The EHIB evaluates health impacts of environmental exposures by reviewing clinical records, and conducting interviews; conducting large-scale studies of patterns of disease and exposure; provides technical assistance for reproductive health issues to other branches of state government; and investigates human exposures to chemical and physical agents, and assesses possible related health risks.

### Process

The Environmental Health Investigations Branch:

- Conducts health and exposure investigations - EHIB responds to emerging environmental health problems, clusters of non-infectious disease, and disasters associated with environmental agents by conducting preliminary investigations and follow-up studies.
- Undertakes health and exposure surveillance - When health concerns suggest the need for surveillance, EHIB monitors trends in the distribution of environmental exposures and health indicators in California.
- Provides public health oversight, technical assistance and training - State and local health agencies and the Legislature turn to EHIB when environmental health problems require training, consultation, advice on environmental health intervention, or evaluation of epidemiologic and toxicologic evidence.
- Facilitates public participation and effective community relations - EHIB ensures that studies and evaluations are responsive to public concerns and needs by inviting the participation of community members, scientists and other involved groups in all stages of its activities.
- Develops policy initiatives and recommendations - Using information obtained from investigations, EHIB assists in the development of public health policy, initiatives and recommendations for specific action at the State and local level.
- Maintains scientific preparedness - EHIB staff are actively involved in developing research methods in the emerging field of environmental health. EHIB is committed to providing the support necessary to ensure that its staff remain current with developments in their fields and the larger society.

### Technology Structure

The EHIB does not currently use a single surveillance information system. Multiple, unique databases have been developed to support separate research efforts. EHIB has just entered into a three-year planning effort in order to develop and implement an interoperable health and environmental tracking program. The EHIB's plan includes measures of effectiveness to verify that the system will be developed based on NEDSS standards.



## **Genetic Health Branch**

### **Role in Public Health**

The Genetic Disease Branch (GDB) works to protect and improve the health of all Californians. GDB runs the largest screening program in the world and sets the standard in delivering high-quality, cost-effective genetic services to all Californians.

### **Process**

The Genetic Disease Branch performs the following tasks to support its mission:

- Screens newborns and pregnant women for genetic and congenital disorders in a cost-effective and clinically effective manner. The screening programs provide testing, follow-up, and early diagnosis of disorders to prevent adverse outcomes or minimize the clinical effects.
- Ensures quality of analytical test results and program services by developing standards and quality assurance procedures, and monitoring compliance with them.
- Fosters informed participation in its programs in an ethical manner through a combination of patient, professional, and public education, and accurate and up-to-date information and counseling.
- Provides ongoing critical review, testing, and evaluation of existing programs to ensure that program objectives and goals are being met.
- Develops programs to adopt new methods and implement new services that further enhance the effectiveness and efficiency of current and future prevention programs.
- Promotes use of high-quality consumer education materials on genetic disorders, screening for birth defects and genetic services.

## **Center for Health Statistics**

### **Role in Public Health**

The Center for Health Statistics (CHS) coordinates and oversees the collection, management, and dissemination of public health and vital statistics data in conjunction with other State agencies, local government agencies, and other customers. The CHS provides technical assistance relating to vital statistics data to users within DHS and external to DHS (such as local government, academia, researchers, and the general public), and actively promotes and disseminates information relevant to the health of the public. The CHS comprises the Office of Vital Records, the Office of Health Information and Research, the Administration Support Section, and the Information Technology Services Section.

### **Process**

CHS's Office of Health Information and Research (OHIR) coordinates the development of health information systems and conducts research relating to the health status of California's population. OHIR comprises the Vital Statistics Section and the Planning and Data Analysis.

- The **Vital Statistics Section (VSS)** maintains, analyzes, distributes, and improves the data contained within California's electronic vital statistics system. The VSS maintains electronic Statistical Master Files of live births, deaths, fetal deaths, marriages, and marriage dissolutions. The Section provides technical assistance to the Department's programs in using California's vital statistics data and applying appropriate statistical analysis for purposes of program planning and evaluation.

- The **Planning and Data Analysis Section (PDAS)** maintains, analyzes, and distributes data needed for assessing the health status of Californians. PDAS assembles and analyzes Department wide data relating to the Year 2000 National Health Promotion and Disease Prevention Objectives and produces related reports. It compiles and analyzes data pertaining to key health status indicators for California's counties and produces related reports.

## **Office of Statewide Health Planning and Development**

### **Role in Public Health**

The Office of Statewide Health Planning and Development (OSHPD) was created in 1977 when the former Department of Health was separated into several new departments. The original mission of the Office was to administer the state's health planning and certificate of need laws. The Office was also given the initial responsibility over seismic safety for hospitals (excluding structural review) and health facility loan insurance through the Cal-Mortgage Program.

### **Process**

To address its mission, OSHPD:

- Serves as the building department for all hospitals and nursing homes in the State.
- Provides loan insurance to not-for-profit health facilities, especially those providing healthcare in underserved communities, to help them develop or expand access to needed services.
- Supports the training of health professionals, especially doctors and nurses who provide primary care services and are willing to practice their profession in underserved communities.
- Collects, analyzes, and disseminates information about hospitals, nursing homes, clinics, and home health agencies licensed in California. The information includes financial reports, data on the use of services, and measures of the quality of care provided to patients.

## D. NEDSS SYSTEMS ARCHITECTURE VERSION 2.0



### NEDSS SYSTEMS ARCHITECTURE Version 2.0, April 15, 2001

The NEDSS Systems Architecture is built around recognized national standards, *de facto* commercial standards that are not tied to particular vendors, and the use of Internet technologies for information interchange. Standardized modular elements are being emphasized in order to facilitate the use of commercial software platforms, to minimize proprietary commercial applications that cross element boundaries, to prepare for module by module element exchange as new technologies are developed, to facilitate technology sharing, and to strive for the rapid exchange of high quality, comparable data.

Fully developed systems will have all of the NEDSS systems elements, and in addition, will have the elements functioning well as an integrated whole.

#### NEDSS Systems Elements:

##### a. Conduct and support web browser-based data entry and data management

**Functional description:** This element will involve developing secure, web browser-based data entry and management capacity for use inside and outside of health departments. Browser-based data entry will be used for data input and results reporting inside of health departments, between local health departments and state health departments, for reporting from and to other sources (e.g., infection control practitioners, small laboratories) and for case management. Sites will have the ability to develop and refine their own systems, but will also be able to incorporate into their web systems web forms and application server code representing public health reports developed by the CDC and others as part of coordinated surveillance systems (e.g., national notifiable diseases reporting, selected EIP activities, and others). Case management tools will be used across categorical program data to develop an integrated, patient-centered design.

**Technical description:** Web browser-based data entry will be developed using commercial application server technology as part of a multi-tiered web development system using open-platform web servers (e.g., Apache, Microsoft's IIS, Netscape) running on Windows NT / 2000, LINUX or UNIX and supporting generic web browsers (HTML 3.0+ / Java). The web server, the application server and the database server will be separate tiers of this system. Web application servers (e.g. those made by Silver Stream, BEA, IBM and Microsoft) can speed the development and upkeep of web input and management systems. JavaScript for field-based data validation in the browser and EJB, CORBA, or DNA (DCOM) components on the server can be implemented for application logic (please see element #e). Application servers, regardless of physical platform will be able to run shared JAVA code. Data delivery to an associated database will use ANSI standard SQL and ODBC or JDBC connectivity. Security over the Internet will be implemented using a Secure Sockets Layer (SSL) capable server and industry standard client certificates or token-based for authentication and selective authorizations. Firewalls will be necessary to protect accumulated data (please see element #h).

b. Accept, route and process electronic HL7 messages containing laboratory, clinical and public health content.

Functional description: This element involves developing the capacity to dynamically accept, import, route to other recipients, and process incoming electronic messages in HL7 format which use the LOINC and SNOMED coding standards. These messages will come, for example, as result reports from local clinical laboratories or emergency departments, from HMO's, from CDC laboratories, or as pertinent information from other public health jurisdictions (e.g., in the setting of multijurisdictional outbreaks). Efforts to initiate public health electronic laboratory reporting with clinical care sites and labs will be encouraged. NEDSS Charter sites and some NEDSS Element Development sites will also develop infrastructure to support XML data exchange, which will provide the message infrastructure for HL7 Reference Information Model (RIM) content.

Technical description: Many laboratory and clinical systems now transmit HL7 version messages. Messages will be dynamically received, processed and, as appropriate, routed to other organizations or stored with either a dedicated interface engine or HL7 message and translation software components running on Windows NT / 2000, LINUX or UNIX servers. The ability to translate and manipulate LOINC and SNOMED codes and to map local lab codes into these standards will be important. Application logic to perform data validation, to queue data reports for completion and to initiate the completion and submission of full case reports will be performed using EJB, CORBA, or DNA (DCOM) components (please see element #e).

c. Implement an integrated data repository.

Functional description: The developed data repository will be integrated (i.e., contain data from multiple state-based and CDC categorical programs), patient-centered where appropriate (i.e., where reporting information is about a person, such as in surveillance case reports), will implement the Public Health Conceptual Data Model / HL7 Reference Information Model structure as appropriate, will include the ability to associate incoming data with appropriate existing data (e.g., a report of a disease in a person who had another condition previously reported), will have the capacity to support data accumulated through various means (e.g., through web-based and thick client systems as well as electronic messages), and will function so that data can be accessed by standards-based interaction with commercial products for reporting, statistical analysis, geographic mapping and automated outbreak detection algorithms as well as the processing of queued data from and for electronic messages.

Technical description: The integrated data repository will implement common database technology (e.g., Sybase, Oracle or SQL Server) running on servers using Windows NT / 2000, LINUX or UNIX and supporting ODBC, ANSI standard SQL and JDBC access for data input from web based systems, reporting and analysis tools. The repository will also be able to house stored procedures that can initiate EJB, CORBA and DNA (DCOM) objects. Appropriate security for the repository will include firewall protection, restricted access, selective authorizations and the encryption of some sensitive patient data (please see element #h).

d. Develop active data translation and exchange (integration broker) functionality.

Functional description: This element supports data translation, data import and export, queuing and messaging for the dynamic bi-directional interchange of data using Extensible Mark-up Language (XML) to and from the integrated data repository, other associated databases and, in

some cases, the within health departments and with other public health agencies. Data integration functionality will be deployed with the ability to rapidly develop ad hoc data exchange interfaces without programming. XML messaging will also provide the messaging infrastructure for future versions of HL7 and X12 content and for some environments may be best achieved with interface engine technology such as in element #b.

Technical description: Integration broker functionality may be fulfilled by an integration broker server, by software components running on shared servers or by some application server technologies. Bi-directional data transmission will occur using XML transfer over HTTP or HTTPS as appropriate. Secure communication with recipient servers will be performed with virtual private network capacity or certificate-based SSL server-to-server communication. Application logic to perform data validation, to queue data reports for completion or to initiate the completion and submission of full messages will be performed using EJB, CORBA, or DNA (DCOM) components (please see element #e). XML messages and associated application logic for program specific reporting will be derived from the Public Health Data Model / HL7 Reference Information Model and will be jointly developed by the CDC and the funding recipients.

e. Contemporary application programming practices - component based, object oriented and cross platform where possible. (formerly - Develop transportable business logic capability).

Functional description: Data validation, business rules for data accumulation, data processing, workflow implementation, data coding and decoding, registry mapping, and case management capabilities will be developed on the application server around the data repository using contemporary programming practices including one of several component development approaches, object oriented code development and, where possible, a cross platform implementation. Application logic for data accumulated via the web, via thick client software, via messaged XML and HL7 will need to be consistently applied to ensure that data quality is good and shared data is comparable.

Technical description: Component development will involve EJB, CORBA or DNA (DCOM). Database access will use SQL and ODBC or JDBC connectivity. Application server development surrounding the data repository will apply business rules and initiate integration broker activity. Data repository stored procedures will need to initiate application server functions.

f. Develop data reporting and visualization capability.

Functional description: Selective data reporting according to user need-to-know, statistical analysis, Geographic Information Systems (GIS) use and other visualization, display and mapping functions will be implemented using COTS (commercial off of the shelf software) solutions through industry standards for access to the data repository.

Technical description: Commercial reporting systems (e.g., Crystal Reports or Actuate, statistical analyses software such as SAS, SPSS or EPI Info 2000 and GIS software (e.g., ArcView or MapInfo) will be integrated using ODBC and JDBC data access. Security and access control will be applied for remote access over public networks using SSL and Certificate or Token-based authentication with appropriate authentication and authorization.

g. Implement a shareable directory of public health personnel.

Functional description: Select information about pertinent public health personnel within state health departments and select local health jurisdictions will be listed in a standards-based information directory. The directory will be shareable and mergeable with directories from other state and local health departments and the CDC to create a directory of public health personnel. The directory will capture information about the roles and expertise of personnel for the use by public health communication and notification systems. Eventual use for authentication and authorization to resources is also anticipated. The directory of public health personnel will be used to guide the flow of information within and among public health agencies for emergent and non-emergent purposes.

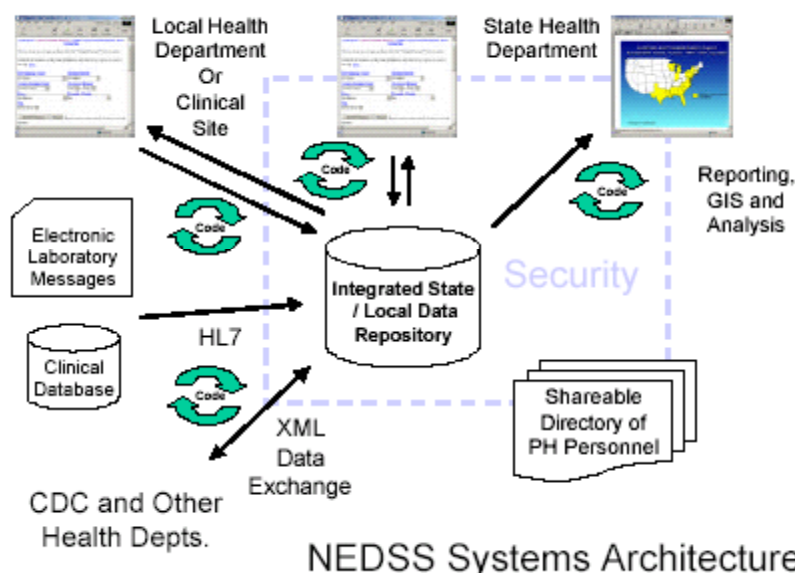
Technical description: Directories will be maintained using the Light Weight Directory Access Protocol (LDAP) services. Data fields in the directory will use X.500 standards for field type and length. Public and non-public field division, standard Object Classes and their attributes and definitions as well as methodologies for replication will be defined in conjunction with CDC and DHHS directories.

h. Implement a security system and appropriate security policies.

Functional description: To develop standards, operating procedures and infrastructure for the secure transmission, processing and storage of sensitive or critical data and the support of sensitive or critical systems. This will include the secure Internet exchange of information based on the creation and operation of a secure Internet connection and gateway facility that can work in concert with the CDC's Secure Data Network (SDN).

Technical description: Security policies will be implemented with authentication based on industry standard X.509 certificates, secure tokens, and other applicable means as identified; access and control of data via selective integrated repository authorization; an encryption engine and appropriate use of encrypted data; and access control through a firewall by data routing to programs and other organizations.

**NEDSS Systems Architecture for State and Large Local Health Departments**





## E. NEDSS CANDIDATE PROJECTS

### Data Standards and Information Requirements

1. **Data Policies, Procedures, and Data Access Standards:** Define the process for consensual development of data policies and procedures. Identify and define data policy issues. Define approval, implementation, and monitoring procedures (Geographic Information System standards and guidelines; common e-collection formats; “small numbers” guidelines). Define standard approaches for how State and County Health Officers gain access to confidential data. Ties in with Communication Plan and Educational Seminars.
2. **California Data Requirements and Roles:** Identify the roles played by public health workers at all levels, and the data elements and reports required per role. Document the common, core data structures that are needed across roles, as well as program-specific extensions for important programs. Develop data flow diagrams, and document requirements for data aggregation, analytics, and visualization.
3. **HL7 Messaging Standards:** Develop specific detailed implementation guides for HL7 messages required for intra-state and State to Federal reporting. Utilize or adapt guides provided by CDC and HL7 were appropriate. Design methods and infrastructure to support mapping of diverse local data structures to approved HL7 formats. Design supporting software artifacts such as XML schemas and mapping templates. Document proposed methods for organizations and programs to transmit HL7 messages to the State.
4. **California Data Dictionary:** Working from the Public Health Logical Data Model (PHLDM) as a starting point, develop precise definitions of each relevant data element, and associated editing and cross-validation rules. Use California requirements to review the HL7 vocabulary provided with the PHLDM, and extend the vocabulary or adapt as necessary to accommodate coding schemes and terminology of California programs and organizations. Publish mappings between HL7 message fields and the PHLDM. Develop important code mapping documents, including SNOMED-LOINC mappings.

### Communication and Education

5. **Communication Plan:** Determine information and communication needs of the stakeholders including how to distribute information through reports, presentations, and informal and formal communications. May tie in with NEDSS Strategic Plan.
6. **Seminars & White Papers:** Educational forums and materials for NEDSS architecture, standards, and future plans; geared towards education of County and State IT and Program Managers and their staff.

### Architecture

7. **Statewide Infrastructure Plan:** Starts with County requirements/feedback on NEDSS architecture and physical architecture (hosting, network, servers); includes diagrams/matrices of common functional data elements for County case management and surveillance.

8. **Data Exchange and Translation:** Define data exchange requirements, including the public health roles, sending and receiving data, the routing and frequency requirements, and translation requirements. Design or select vendor software components to support data exchange and translation, including message broker services and parsers. Design the configuration and integration of the selected software scheme, and develop a plan for maintaining changes to data exchange requirements over time.
9. **Reporting and Visualization:** Document the generic requirements for reporting and visualization services, and design or select software infrastructure to support the scheme. Propose standards for development of web-based structured reports, for interactive datamart cubes to support multidimensional data analysis, and for GIS software to support spatial presentation of public health data. Design common presentation guidelines to promote consistency across programs and datasets.
10. **Data Architecture:** Determine requirements for centralized databases at the State level, and design logical and physical databases accordingly, starting from the PHLDM as a guide. Develop scheme for coordinating with distributed operational databases maintained by various programs. Determine requirements for data replication and aggregation, and design the data warehouse architecture and data marts accordingly. Design programs and mappings to transfer data from State databases to State data warehouses or data marts.
11. **Portal Web Site, User Interface Standards:** Determine the range of applications to be integrated into the site. Design a common look and feel as guidelines for user interface developers. Design the integration with a central directory and with security services, and the scheme to be used for centralized sign-on and authentication. Select and configure the use of supporting software such as portal services, including consideration of cross-application integration.
12. **Component Architecture:** Perform cross-application analysis to identify opportunities for reuse of objects and services. Document library of proposed services, methods, and parameters. Select proposed technology and standards for object and services implementation. Determine the logical design for placement of services, and communication between services. Work with California data centers to accommodate standards and support capabilities of the State.
13. **Security Architecture:** Design and develop central approaches and infrastructure for several aspects of data security, including access control, user authentication, data encryption, application security, and database security.

### Software Implementation Projects

14. **Portal/User Interface – Directory/Security:** Design and execute detailed implementation and test plans for requirements identified in Project 11, **Portal Web Site, User Interface Standards**, according to designs proposed in that project. Complete integration with HAN/directory systems such as RHEACTS.
15. **Common Components/ Services:** Design and execute detailed implementation and test plans for requirements identified in Project 12, **Component Architecture**, and Project 13, **Security Architecture**, according to designs proposed in those projects.
16. **Patient Registry System:** Design, develop, or select vendor software components to issue patient identifiers to be used across California programs, where cross-program data integration is required to support public health objectives. Implement a scheme to manage



the patient IDs and the central data stored per patient, and to match, merge, and de-duplicate data records from the various participating programs, as required.

17. **Exchange/Translation Capabilities:** Design and execute detailed implementation and test plans for requirements identified in Project 8, **Data Exchange and Translation**, according to designs proposed in that project.
18. **Databases – Central IDR, and Data Marts/Reporting/Visualization:** Design and execute detailed implementation and test plans for requirements identified in Project 9, **Reporting and Visualization**, and Project 10, **Data Architecture**, according to designs proposed in those projects.

## F. GLOSSARY

<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>ANSI</b>	American National Standards Institute ANSI creates standards for the computer industry
<b>APHL</b>	Association of Public Health Laboratories
<b>ASTHO</b>	Association of State and Territorial Health Officers
<b>Authentication</b>	Systematic way for establishing proof of identity between two or more entities, such as users and hosts
<b>AVSS</b>	Automated Vital Statistics System
<b>BPRP</b>	CDC's Bioterrorism Preparedness and Response Program
<b>BT</b>	Bioterrorism
<b>BTRS</b>	BioTerrorism Readiness Suite
<b>Business issues and needs</b>	What must be addressed to accomplish the business objectives, achieve the goals, and realize the vision
<b>CAHAN</b>	California Health Alert Network
<b>Cal/EPA</b>	California Environmental Protection Agency
<b>CalPHIN</b>	California Public Health Information Network
<b>CAPHLD</b>	California Public Health Laboratory Directors
<b>CCLHO</b>	California Conference of Local Health Officers
<b>CCLHDM</b>	California Conference of Local Health Data Management
<b>CCR</b>	California Cancer Registry
<b>CD</b>	Communicable Disease
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CDMS</b>	Communicable Disease Management System
<b>CEDII</b>	California Electronic Data Integration Initiative
<b>CELDAR</b>	California Electronic Laboratory Disease Alert and Reporting System
<b>Champion</b>	Person(s) responsible for supporting and leading a change initiative
<b>CHS</b>	Center for Health Statistics
<b>CLPPB</b>	Childhood Lead Poisoning Prevention Branch
<b>CSTE</b>	Council of State and Territorial Epidemiologists
<b>DCDC</b>	Division of Communicable Disease Control

<b>DHS</b>	California Department of Health Services
<b>DISB</b>	Disease Investigations and Surveillance Branch
<b>DZ</b>	Disease
<b>EDRS</b>	Electronic Death Registry System
<b>EHIB</b>	Environmental Health Investigations Branch
<b>ELR</b>	Electronic Lab-based Reporting
	ELR is the electronic transmission of public health data from clinical laboratories to public health agencies
<b>Encryption</b>	Process of converting data from an easily understandable form to what appears to be random, useless gibberish, using mathematical processes that are difficult or impossible to duplicate without knowledge of how the encryption was accomplished
<b>EPHTN</b>	Environmental Public Health Tracking Network
<b>EPI-X</b>	Epidemic information Exchange
<b>External Challenges</b>	Current environment challenges faced by the California NEDSS effort
<b>Firewall</b>	Network device or collection of devices that protect inside “trusted” networks from external “untrusted” networks like the Internet, using a variety of technical processes
<b>FSR</b>	Feasibility Study Report
<b>GIS</b>	Geographic Information System
	Software used to relate data to geographic locations for mapping, analysis, and manipulation
<b>HAN</b>	Health Alert Network
<b>HARS</b>	HIV/AIDs Reporting System
<b>HASTEN</b>	Health Alert System Training and Education Network
<b>HEDIS</b>	Health Plan Employer Data and Information Set
<b>HHSA</b>	Health and Human Services Agency
<b>HIPAA</b>	Health Insurance Portability and Accountability Act
<b>HISP</b>	Health Information and Strategic Planning Division
<b>HISSB</b>	Health Information and Surveillance Systems Board
<b>HIV</b>	Human Immunodeficiency Virus
<b>HL7</b>	Health Level 7
	HL7 is a standards development organization formed in 1987 to produce a standard for hospital information systems
<b>IDR</b>	Integrated Data Repository

<b>Infrastructure</b>	Variety of mechanical, physical, and support technologies that enable and facilitate information and data exchange, as well as communication among and between people and organizations
<b>Integration</b>	Ability to share critical information electronically at key decision points throughout the public health system.
<b>Interoperability</b>	Capability to communicate, execute programs, transfer data among various units in a way that requires systems users to have less human intervention in the initiation of intra-system actions
<b>ISO</b>	International Organization for Standardization
<b>IT</b>	Information Technology
<b>ITSD</b>	Information Technology Services Division
<b>IZ</b>	Immunization
<b>LHD</b>	Local Health Department
<b>LHJ</b>	Local Health Jurisdiction
<b>LIS</b>	Laboratory Information System
<b>LOINC</b>	Logical Observations, Identifiers, Names and Codes  A set of names and ID codes for identifying laboratory and clinical observations.
<b>LRN</b>	Laboratory Response Network
<b>MD</b>	Medical Doctor
<b>MDL</b>	Microbial Diseases Laboratory
<b>NACCHO</b>	National Association of County and City Health Officials
<b>NAHDO</b>	National Association of Health Data Organizations
<b>NAPHSIS</b>	National Association of Public Health Statistics and Information Systems
<b>NEDSS</b>	National Electronic Disease Surveillance System
<b>NETSS</b>	National Electronic Telecommunications System for Surveillance
<b>Objective</b>	Specific measurable targets for accomplishment that contribute to achieving the vision and goals, address strategic issues, and collectively, realize the vision for technology
<b>OHC</b>	Office of HIPAA Compliance
<b>OHI</b>	Office of HIPAA Implementation
<b>OOA</b>	Office of HIV/AIDS
<b>OSHPD</b>	Office of Statewide Health Planning and Development

<b>Outcome</b>	Reflects the actual results achieved, as well as the impact of benefits for stakeholders during or after their involvement with a program. Outcomes may relate to knowledge, skills, attitudes, value, behavior, condition, or status
<b>PAM</b>	Program Area Module
<b>Performance Measure</b>	Provide a measure of discipline in evaluating the relevance and contribution of individual strategies and projects to overall strategic goals, and ensures accountability by creating objective measures of success
<b>PHCDM</b>	Public Health Conceptual Data Model  A high-level conceptual data model, developed as part of the CDC NEDSS initiative
<b>PHIN</b>	Public Health Information Network
<b>PHL</b>	Public Health Lab
<b>PMBOK</b>	Project Management Body of Knowledge
<b>PPMB</b>	Planning and Project Management Branch
<b>Privacy</b>	Individuals' interests in preventing the inappropriate collection, use, and release of personally identifiable information in the public health system
<b>Privacy Policy</b>	A plan, procedure, or course of action designed to influence and determine decisions and actions regarding the collection, use, and disclosure of personal information
<b>Public Health System</b>	A network of people, information systems, organizations, and public health processes focused on the health of the population
<b>Public Health Information</b>	Any and every type of information that is collected, transmitted, or maintained by the public health system
<b>RASSCLE</b>	Response and Surveillance System for Childhood Lead Exposures
<b>RFP</b>	Request for Proposals
<b>RHEACTS</b>	Rapid Health Emergency Alert Communication and Training System
<b>RHEIS</b>	Refugee Health Electronic Information System
<b>SIIS</b>	Statewide Immunization Information System
<b>SNOMED</b>	Systemized Nomenclature of Medicine  A nomenclature classification for indexing medical vocabulary, including signs, symptoms, diagnoses, and procedures
<b>Stakeholder</b>	Individual, group, or organization having a vested interest in the organization and expecting certain levels of

	performance from it
<b>Standards</b>	Common and repeated use, rules, guidelines, or characteristics for products, processes, or services
<b>STD</b>	Sexually Transmitted Disease
<b>Strategic Goal</b>	Desired end results, generally 3-5 years
<b>Strategic Plan</b>	Plan of action aimed at achieving a desired future condition
<b>Strategies</b>	Actionable plans for achieving the goals and objectives
<b>TB</b>	Tuberculosis
<b>TIMS</b>	Tuberculosis Information Management System
<b>Vision</b>	Brief description of the ideal future condition
<b>VRDL</b>	Viral and Rickettsial Disease Laboratory